DEVELOPING THE KNOWLEDGE-BASED HUMAN RESOURCES THAT SUPPORT THE IMPLEMENTATION OF THE NATIONAL DUAL TRAINING SYSTEM (NDTS): EVALUATION OF TVET TEACHER'S COMPETENCY AT MARA TRAINING INSTITUTIONS

MAHAZANI ALI

This thesis is submitted in fulfilment of the
award requirements for the Degree of
Doctor of Philosophy in Technical Education

Faculty of Technical and Vocational Education
Universiti Tun Hussein Onn Malaysia

in collaboration with

Institut Technik Und Bildung (ITB)
Universitat Bremen, Germany

JUN 2015

ABSTRACT

Development in the world of technical and vocational education and training (TVET) on an ongoing basis is a challenge to the profession of the TVET-teachers to maintain their performance. The ability of teachers to identify the competencies required by their profession is very critical to enable them to make improvements in teaching and learning. For a broader perspective the competency needs of the labour market have to be matched by those developed within the vocational learning processes. Consequently, this study has focused on developing and validating the new empirical based TVET-teacher competency profile and evaluating teacher's competency. This study combines both quantitative and qualitative research methodology that was designed to answer all the research questions. The new empirical based competency profile development and TVET-teacher evaluation was based upon an instructional design model. In addition, a modified Delphi technique has also been adopted throughout the process. Initially, 98 elements of competencies were listed by expert panel and rated by TVET institutions as important. Then, analysis using manual and statistical procedure found that 112 elements of competencies have emerged from seventeen (17) clusters of competencies. Prior to that, using the preliminary TVET-teacher competency profile, the level of TVET-teacher competencies was found to be Proficient and the finding of 112 elements of competencies with 17 clusters was finally used to develop the new empirical based competency profile for MARA TVET-teacher. Mean score analysis of teacher competencies found that there were gaps in teacher competencies between MARA institutions (IKM) and other TVET institutions, where MARA-teacher was significantly better than other TVET teacher. ANOVA and t-test analysis showed that there were significant differences between teacher competencies among all TVET institutions in Malaysia. On the other hand, the study showed that teacher's age, grade and year of experience are not significant predictors for TVET-teacher competency. In the context of mastering the competency, the study also found that three competencies are classified as most difficult or challenging, twelve competencies are classified as should be improved, and eight competencies are classified as needed to be trained. Lastly, to make NDTS implementation a reality for MARA the new empirical based competency profile and the framework for career development and training pathway were established. This Framework would serve as a significant tool to develop the knowledge based human resources needed. This will ensure that TVET-teachers at MARA are trained to be knowledgeable, competent, and professional and become a pedagogical leader on an ongoing basis towards a world class TVET-education system.

ABSTRAK

Pembangunan dalam dunia Pendidikan dan Latihan Teknikal dan Vokasional (TVET) secara berterusan merupakan cabaran kepada tenaga pengajar TVET untuk mengekalkan prestasi mereka. Keupayaan tenaga pengajar untuk mengenal pasti kompetensi yang diperlukan adalah sangat penting bagi membolehkan mereka meningkatkan diri dalam bidang pengajaran dan pembelajaran. Dari perspektif yang lebih luas, kompetensi yang diperolehi semasa proses pembelajaran perlu dipadankan dengan keperluan sebenar semasa mereka bekerja. Justeru itu, skop kajian adalah bertujuan membangunkan dan mengesahkan profil kompetensi baru tenaga pengajar TVET yang dihasilkan secara empirikal. Ianya juga bertujuan untuk menilai kompetensi tenaga pengajar dengan menggunakan instrument yang dihasilkan. Kajian ini menggabungkan kedua-dua kaedah penyelidikan kuantitatif dan kualitatif bagi menjawab enam soalan kajian. Pembangunan profil kompetensi baru secara empirikal ini adalah adalah berasaskan kepada model Rekabentuk Instruksi. Di samping itu, teknik *Modified Delphi* telah diguna pakai semasa proses pembangunan profil kompetensi ini. Terdapat 98 elemen kompetensi disenaraikan oleh panel pakar dan telah diklasifikasikan sebagai *'Penting*' hasil kajian dari 35 pusat TVET seluruh Malaysia. Analisis secara manual dan kaedah statistik membuktikan 112 elemen kompetensi telah dihasilkan dari tujuh belas (17) kelompok kompetensi. Sebagai tambahan kepada penilaian tahap kompetensi tenaga pengajar, hasil analisis mendapati ianya adalah di tahap Mahir. Seterusnya, elemen kompetensi yang dihasilkan digunakan untuk membangukan profil kompetensi pengajar TVET secara empirikal yang baru. Analisis Min terhadap kompetensi tenaga pengajar TVET mendapati bahawa terdapat jurang antara institusi MARA (IKM) dan institusi TVET yang lain, di mana pengajar TVET di MARA adalah jauh lebih baik daripada lain-lain pengajar TVET. Analisis ANOVA dan ujian-t kompetensi tenaga pengajar TVET menunjukkan bahawa terdapat perbezaan yang signifikan bagi semua institusi TVET di Malaysia. Selain dari itu, kajian ini juga membuktikan faktor umur, gred dan tahun pengalaman bukan merupakan peramal yang signifikan bagi menentukan kompetensi pengajar TVET dalam institusi MARA. Dalam kontek untuk menguasai kompetensi yang ditetapkan, kajian juga mendapati bahawa tiga elemen kompetensi diklasifikasikan sebagai Sukar atau mencabar, dua belas diklasifikasikan sebagai Perlu dibaiki dan lapan diklasifikasikan sebagai Memerlukan latihan. Kesimpulannya, bagi memastikan perlaksanaan Sistem Latihan Dual Nasional (NDTS) dalam MARA menjadi kenyataan, satu profil kompetensi berasaskan empirikal yang baru serta satu kerangka pembangunan kerjaya dan laluan latihan perlu dibangunkan. Kerangka ini dapat dijadikan sebagai sumber rujukan bagi tujuan pembangunan sumber manusia yang berasaskan kepada pengetahuan (*Knowledge-based human resource)*. Dengan adanya profil dan kerangka ini, ianya akan memastikan bahawa semua pengajar TVET di MARA dapat dilatih untuk menjadikan mereka lebih berpengetahuan, kompeten serta profesional dan akhirnya mereka ini dapat menjadi seorang pemimpin pedagogi secara terancang dan berterusan ke arah perlaksanaan sistem pendidikan TVET bertaraf dunia.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF EQUATIONS

LIST OF ACRONYMS

BKT	*Bahagian Kemahiran dan Teknikal MARA* (MARA Vocational and Technical Division
DSD	Department of skills development
HR	Human resource
HRM	Human resource management
ICT	Information communication technology
IKBN	*Institut Kemahiran Belia Negara* (National Youth Skills Institute)
IKM	*Institut Kemahiran MARA* (MARA Vocational Institute)
ILP	*Institut Latihan Perindustrian* (Industrial Training Institute)
IPGKPT	*Institut Perguruan Guru Kementerian Pengajian* Tinggi (Institute of Technical Education Campus)
KKTM	*Kolej Kemahiran Tinggi MARA* (MARA High Technical College)
MARA	Majlis Amanah Rakyat (Council for Indigenous People)
MCE	Malaysia Certificate Education
MOE	Ministry of Education
MQA	Malaysia Qualification Agency
MQF	Malaysia Qualification Framework
MRSM	*Maktab Rendah Sains MARA* (MARA Junior Science College)
MYS	Ministry Youth and Sport
NDTS	National Dual Training System
NOCC	National Occupational Core Curriculum
NOSS	National Occupational Skills Standard
PMR	*Penilaian Menengah Rendah* (Lower Secondary Examination)
SKM	*Sijil Kemahiran Malaysia* (Malaysia Skills Certificate)
SME	Semi-Medium Entreprise
SPM	Sijil Pelajaran Malaysia (Malaysia Certificate of Education)
SPSS	Statistical Package for Social Science
SVE	Supervisor's evaluation
TNA	Training needs analysis
TSE	Teacher's self-evaluation
TTC	TVET-teacher' competency
TVET	Technical Vocational Education and Training
UTHM	University Tun Hussein Onn, Malaysia

LIST OF ANNEX

CHAPTER 1

COMPETENCY PROFILE FOR MARA TVET-TEACHER: ESTABLISHING THE CONTEXT AND RATIONAL

This chapter provides the background of the study followed by the overview of Technical Vocational Education and Training (TVET) teacher training, and transformation of TVET in Malaysia. In addition, it also provides the current status in TVET such as TVET-teacher competency and human-resource status. Furthermore, it discusses some issues in TVET and then lists out the research goals that lead to the formation of the research questions. In addition to the six research questions; five hypotheses were established for research question three (3) and four (4). Then, it also outlines the significance of the study. Next, the research framework that gives a clear picture on how this study will be carried out is also included. Lastly, it also provides the structure of this thesis and how it will be presented.

1.1 Background of the study

This mixed method study will address the issue on the development of an empirical based competency profile for the MARA TVET-teachers. A triangulation mixed method's design will be used, a type of design in which difference but complementary data will be collected on the same topic. In this study, a modified Delphi process will be used in gathering both qualitative and quantitative data.

Previously, Nelson (2001) used a Delphi-based methodology to identify the competencies needed by SMEs who become TVET practitioners. She recommends for future study this method suitable for the development of competency profile:

> …although comprehensive national studies on competencies needed in human-resource development and human performance improvement were used, as were studies that focused on technical trainers and instructors, some competencies may be less critical than others. A study similar to those conducted by ... to develop the … competency models could be used to

> develop one for TVET practitioners. TVET practitioners who have taught in both educations and industry could evaluate the competencies and come to a consensus on those required (Nelson, 2001, p4).

Consequently, to keep TVET curricula is current and relevant to industrial requirements, TVET-teachers and instructors need to be at the very least well informed on the methodology of analysing occupational competency needs directly and empirically in the world of work. In line with these suggestions, the researcher believes a similar approach for the development of profile competency for Malaysian TVET to be used.

The first reason for collecting qualitative data is that there are no existing instruments to evaluate teacher competency and that instrument needed to be developed based on qualitative views of panels (Morales, 2005). Second reason for collecting both quantities and qualitative data is to bring together the strength of both forms of research (Creswell & Clark, 2007) to review numerous literatures of competency models, listed competencies required, compare results, validate results and corroborate results. Based on the two reasons, the researcher decided to adopt a modified-Delphi methodology for carrying out this study.

1.2 TVET-teacher training in Malaysia

The National Education System in Malaysia was established in 1957 through the Education Ordinance 1957. The system for school level consists of pre-school education at age's four to six, primary education at age's seven to twelve, secondary education at ages thirteen to seventeen and post-secondary education at ages eighteen and above.

The teacher education and training for TVET in Malaysia initially are established to train the secondary school teachers only. Later, in line with the suggestion from the *Razak Declaration* about vocational and technical education, a technical teacher trainee's college was suggested to be built in 1962.

In addition, the Malaysian Government agreed to seek technical expertise assistance from Canada to study on creating a technical teacher trainee college in Malaysia. This college is then called *Maktab Perguruan Teknik*, the Malay language meaning for Technical Teacher Training College. Graduates from this college will be teaching either the secondary technical school or a vocational school. Furthermore,

this Technical Teacher Training College is upgraded to offer courses at degree level beginning the year 2006. After a while, the college became known as the National Institute of Technical Teachers.

On the other hand, the recruitments of teachers for post-secondary education were from industries and graduates from universities or the institution of higher learning such as polytechnics, MARA Vocational Institutes, Industrial Training Institutes, and National Youth Skill Training Institutes. Technical vocational education and training at post-secondary education initially, only focused on low achiever students. In fact, most of this group of students are not highly interested in academic-based education, but prefer doing practical 'hands on' jobs, rather than memorizing or reading many books. Later down the years, TVET in Malaysia becomes a national agenda where; TVET is currently considered an alternative for further education.

Universiti Tun Hussein Onn Malaysia (UTHM) formerly known as Polytechnic Staff Training Centre, established on September 16 of the year 1993 is one of the institutions that are responsible to train TVET-teacher in Malaysia. In the past, UTHM only focuses in technical skills and academic knowledge in their curricula. However, in present, UTHM is responsible in creating a human resource with soft-skills such as communication, leadership, entrepreneurship, ICT, R&D, social skills and many others. Because of that, UTHM plays a pivotal role in training and producing a competent TVET-teacher in various technical and vocational fields as well as engineering graduates.

1.3 Transformation of TVET in Malaysia

Transformation of TVET in Malaysia in the year 2013 leads a difference perspective among Malaysian. Consequently, TVET in Malaysia is no longer treated as second-class education. In line with this transformation, TVET-students could be able to graduate at early at ages sixteen with a diploma certificate level. It follows that; this new transformation will attract students as they are exposed to basic vocational subject at their early ages of thirteen. Later, they should be able to choose majors skills as their preference until they are graduated.

Recognizing the importance of TVET as a vehicle to produce the knowledge based human resource, the Ministry of Education Malaysia has to restructure the

sixty-nine technical high schools to vocational high school. After all, students at the vocational high school are expected to enhance not only their competency and knowledge but also to enhance their innovation and creativity. According to Deputy Prime Minister of Malaysia during an interview with Bernama on September 9th 2012:

> …the Vocational Education Transformation (VET) Program, aimed at strengthening further Malaysia's vocational education, will be implemented in 2013…the Program was being implemented to support the national economic transformation agenda in churning out skilled and trained manpower…efforts to develop the trained manpower required has yet to meet the government's aspiration, although vocational education long was established in Malaysia (Yassin, 2012).

The emphasis on improving the quality of TVET in Malaysia is particularly prominent in order to contribute to a national consensus on high income. National Philosophy of Education outlines a number of criteria in which; it will produce individuals who are balances and harmonious their physical, emotional, intellectual and spiritual quotient. Evidence from the Vocational Education Transformation Plan outline, five key strategies to mainstreaming TVET in Malaysia. The strategies are; the transformation of the TVET curriculum; the transformation of the TVET institutions; Collaboration with strategic partners in the industry; Transformation of the TVET assessment; and Transformation of the TVET organisation. This transformation also leads to affect changes in the economic, social and political in themselves, society, and country. The researcher view is that, TVET in Malaysia becomes a highly serious agenda because it can produce the knowledge based human resource; a pool of semi-killed worker, skilled worker and a professional for the country.

With a strong demand in producing qualified knowledge-based human resources, especially in a developing country toward knowledge-based economy, issues related to TVET-teacher competency should not be abandoned. Hence, it is a necessity to establish a new competency profile for TVET-teacher in Malaysia and MARA specifically.

1.4 Current TVET status

Any analysis of trends and issues in Europe is faced with the wide diversity of historical developments and of institutions, which can be observed between European countries. This diversity is particularly striking in the area of TVET, which is closely related to the overall educational system. TVET systems are expected to meet new requirements, which result from the combination of three interrelated factors; the worldwide diffusion of information technologies, economic competition, and changes in work organisation (Bertrand, 1998). In respect of these factors, this section outlines the status of research related to the TVET-teacher competency and human-resource status.

1.4.1 TVET-teacher competency

The German Education Council stipulated two areas of competency for all teachers, namely; specialized competency and pedagogical competency (Bauer, 2007). Further clarification from Bertrand (1998), the concept of competency tends to prevail on the more traditional notion of skills. He noted the employers tended to put more emphasis on the overall competency of individuals and especially on their ability to communicate, to solve problems and to work in teams rather than on their essentially technical skills. The researcher view is that, the major challenge is not so much to train the TVET-teacher for the utilization of new technologies, but rather for doing the kinds of work that the technology cannot perform, i.e. those, which require adaptability, creativeness and a human relationship. From this point, we should know what elements of the competencies require by them to perform their duties as a TVET-teacher. Consequently, the following paragraph discussed TVET-teacher competency from different scholars.

Deitmer & Heineman (2003), point out five categories of TVET-teacher competencies. The competencies are in the area of; professionalism, management, analytical, social and communication, and knowledge about framework conditions. In addition, Md Yunos (2010) in his study reveals six competency domains to be considers in the teacher-training program such as knowledge, skill, ethics and professionalism, social process, social accountability and entrepreneurship.

On the other hand, Kurnia, Dittrich, & Ilhamdaniah (2013) claims, it is mandatory, that TVET-teacher; to include the relevant knowledge at work places, to include the teaching of the methodologies, to run research, and to be able to analyses work places or work processes. Meanwhile, Sam (2012) points out TVET-teachers need to have relevant training qualifications, pedagogical competent and having the occupational skills. Indeed, Abebe (2010) coined the technical competencies, teaching methodology competencies, and personal and social competencies are required by TVET-teacher for their personal development in the future.

Further, Valli & Ariev (2002) claims on assessing student, integrating students, organize and manage the classroom efficiently, and provide learning pathway also prerequisite by TVET-teacher. Then, an analysis of teacher standard form Texas State Board of Education revealed that teacher could have a competency to operate teaching aids, and manage workshop & classroom and help students (Texas State Board of Education, 1997).

In conclusion, some common elements of competencies were found. The elements of competencies are; manage classroom and workshop (Valli & Ariev, 2002;Texas State Board of Education, 1997), manage student (Valli & Ariev, 2002; Texas State Board of Education, 1997), pedagogical and training competency (Sam, 2012; Deitmer & Heineman, 2003), professional (Deitmer & Heineman, 2003; Md Yunos, 2010), social (Abebe, 2010; Deitmer & Heineman, 2003; Md Yunos, 2010), and teaching competencies (Abebe, 2010; Kurnia, Dittrich, & Ilhamdaniah, 2013). The detail discussion of the competency will be discussed in the section 2.6.

1.4.2 Human-resource status

Teachers in TVET play an important role as main vectors for the creation, development, sharing and transfer of knowledge. In the same way, TVET-teacher is playing a crucial role in this process of educate students. In order to master complex tasks, teachers in TVET should be highly competent, motivated and committed. In addition, the professions of teacher have to be very attractive in order to attract enough young and talented people to become teacher or trainer (European Commission, 2005). According to Bauer (2007), TVET-teacher must be professionals as well as having profound knowledge of business and work processes, and knows how to transform this knowledge into teaching practice.

Consequently, TVET-teachers are increasingly involved in the shaping of TVET processes and the TVET system according to the needs of society and economy. They also have to assume a growing responsibility for the societal development. In order to develop the required quality of TVET teacher education, all available resources have to be used, such as the academic excellence of universities in research and development, the knowledge and competency of the economic sectors, and the perspectives that lie in the international exchange of knowledge and experiences.

Indeed, due to the rapid change of the world economy, Malaysia will need to develop its human resource to achieve a high-income nation status. It is necessary to enhance competencies among Malaysian to increase their employability. Thus, the Tenth Malaysia Plan emphasis on mainstreaming and broadening access to quality TVET and enhancing the competencies of TVET graduates (The Tenth Malaysia Plan: 2011-2015, 2010). For that reasons, four strategies will be adopted to mainstream and broaden access to quality TVET as Malaysia improve the perception on TVET, developing highly effective TVET-teacher, revising TVET curriculum, and streaming the delivery of TVET. Further, the TVET institutions must produce highly skills (competent) graduates, who are able to create, innovate, and exploit new idea as well as apply and develop technologies.

1.5 Problem statements

Undoubtedly, in supplying Malaysia with excellent qualities of the knowledge-based human resources (The Ninth Malaysia Plan, 2005), the universities and training institutions are not only concentrating on knowledge and technical skills training, but to include generic skills required by industries in their curriculum. In addition, graduates cannot merely possess knowledge and skills but the capability to apply them with confidence within varied and changing situations. Besides that, they also expected to continue developing their specialist and skills long after they left formal education and training (Zawawi, 2005). Therefore, in order to provide excellent qualities of the knowledge-based human resources for Malaysia, several issues and problems regarding technical vocational education and training must be resolved. The main issues and problems from various studies are discussed in the following paragraph.

According to various researches, many teachers lack competency in the subjects they teach. According to research by MERIC (2008), employers are facing lack of competencies and deficiencies in specific technical skills among their employees. This phenomenon is also faced by TVET-teachers in Malaysia, especially at MARA institutions. As a result, most of them felt unprepared in the classroom during their teaching session. Similar finding was discovered from the informal survey during the recruitment of new teacher conducted at IKM Kuching in 2007; fresh graduate teachers interviewed are identified to have a lacking in teaching competency. In addition, previous research done by Northwest Policy Centre (Agriculture & Food-Processing Industry Skill Gap Analysis, 2002) found that competency among employee was a major issue; about sixty percent of them were lacked academic skills. One-third was lacked communication skills, while one quarter was lacked on their occupational skills (Agriculture & Food-Processing Industry Skill Gap Analysis, 2002).

Next, Lauglo (2006) acknowledged that TVET human resources are chronically lacking in many countries. He points out there was a problem of ensuring the recruitment of the prospective teachers. Majority of them were fresh graduates, and they do not have working experience either in teaching or related technical area. As a result, they could not deliver the teaching processes effectively and were not capable of performing a practical job.

Similarly, the lack of qualified teacher is also happening in Malaysia and the neighbouring countries, as stated by Omar & Paryono (2008); there are lacked of qualified TVET-teacher in many countries like Brunei, Lao, Malaysia, Philippines and Thailand. Further clarification from Omar & Paryono (2008), they found that inadequate knowledge, skills and lack of industrial experience of TVET-teachers were considered as one of the major issue in Philippines and Loas.

While the majority of TVET-teachers meet the minimum qualification standard set by each country, some countries are still struggling to employ TVET-teachers with the relevant knowledge and skills. This shortfall remains a major barrier to achieving their education goals (Improving TVET-teacher competency and teaching effectiveness in the Pacific, 2010). Nanci & David (2006) also highlighted their concerned with TVET-teacher quality with related to competency because TVET-teacher quality has a stronger impact on student's achievement.

In Malaysia, graduates from TVET institution have difficulties in finding job in government sector. They are not recognised to work as a TVET-teacher since most institutions owned by government. Currently, most TVET-teachers working in the government are from universities with engineering qualification. Further, the non-engineering graduates such as those who possess the skills, vocational or technology qualifications are not recognised for working with government as a TVET-teacher in Malaysia.

Consequently, Bauer (2007) insists that, there is a weak practical orientation during the study of the subject matter. He added there is a missing connection between studies of educational and social science and concrete teaching practice. It was found that, the study course at university did not provide practical pedagogical skills as required by the TVET-teacher during their real job (Bauer, 2007) and the sophistication of technology in the industry is not in line with the content of teaching in institutions (Md. Nasir, et. al, 2011). This phenomenon, also happening in Malaysia because the existing TVET-teachers are resistance with the changing of a new technology, some of them are not willing to go for re-training due to a personal problem, and some are not ready for re-training.

While O'Hanlon-Rose (2008) argued that skill shortage, and implicitly the skills gap, created through economies, demographic and social-culture change was a highly topical issue. He defined skill gaps as occur where existing employees (TVET-teacher) do not have the required qualifications (competency), experience and specialised skills to meet the skills needs for an occupation. Furthermore, Malaysian industries frequently complaints of mismatch between the skills required and those possessed by graduates (George, 2006)

Besides that, there is no framework or competency profile being developed among the TVET-teachers who are teaching in vocational or technical education in Malaysia (Ghazali, 2008). In addition, Goh (2011) in her study has agreed there is no TVET-teacher standard (competency profile) developed empirically in Malaysia. Goh (2011) emphasis that:

> Because the Malaysia Teacher standard (competency profile) is still new in Malaysia, the standard-based effort has not undergone much research and scrunity, therefore, very little (if any) empirical data exist to indicate how effective it has been to improve teaching or how it has affected individual teachers or on teacher education (Goh, 2011, p89).

Further, Bauer (2007) believed the number of literature within this field was not countable. However, a precise theoretically founded and empirically based professional profile (competency profile) of TVET-teacher does not exist. Bauer & Gollmann pointed out two issues;

> First, profile being developed not substantiated by theory and supported from a basis of empirical investigations. Second, there were no comprehensive (or empirical) audits of the current position been carried out with regard to the quality, and the effects on the learning processes initiated by TVET-teachers (Bauer & Gollmann, 2008, p386).

Currently, a proper training pathway for TVET-teachers in MARA is not available. As a result, teacher's training Programd is not properly planned, and sometimes it has depended on the officers in charge. There is a case whereby the teachers do not apply what they had learned because the trainings were not relevant to their current job. For example, they are sending to attend courses related to the development of curriculum, but their current job is industry's liaison. Sometimes they repeated the same courses they already attended. The selections of teachers attending courses are made without a proper planning.

Meanwhile, Omar & Paryono (2008) found great issues and problems that relate to TVET in various countries in Asia such as in Indonesia, Philippine, Vietnam, Malaysia, Cambodia and Brunei. It is true that, from their findings:

> …the absence of national competency standard in Indonesia…there is a weak linkage between TVET institutions and industries found in Philippine…the deficiencies in curricular and instructional materials… there are inadequate TVET schools and institution (Omar & Paryono, 2008, p6).

Finally, Omar & Paryono (2008) coined the irrelevant TVET program is an issue in Cambodia, while, unsystematic staff development in Brunei. In order to improve TVET, they suggest TVET-teachers must be support to; upgrade their qualification; provide continuous training, and re-training. Institution need to; develop appropriate curriculum, develop capacity building (competency profile), design teacher-training program, develop teaching and learning resources evaluate teacher's competencies, and in lining the program base one industrial need. Overall, the issues could be summarising as follows:

i. **Qualities of TVET-teacher** -Many teachers lack competency in academic, communication, pedagogy and industrial experiences. In addition, new teachers lack of teaching skills and pedagogical experiences.

ii. **Skills mismatch** -There are skill gaps for existing TVET-teacher because they do not have the requires qualifications. Further, the universities do not provide practical pedagogical skills as required by the TVET-teacher. There is weak practical orientation during the study of the subject matter. Thus, some countries are still struggling to employ teachers with the relevant knowledge and skills.

iii. **Recognition** -Recognition of TVET graduate is low;

iv. **TVET-teacher competency profile** -There is no framework or competency profile being developed empirically and the absence of competency standard in some countries.

v. **Staff development** -Unsystematic staff development in some country like Malaysia. No proper training path for TVET-teachers in MARA is available. The existing teachers are resistance of a new technology, not willing for re-training or not ready for re-training.

vi. **Training provider** -Inadequate in TVET schools and institutions in some countries.

Based on the issues highlighted, some questions need to be resolved. Wisniewski et.al. (2003) have added:

> The need for developing key occupational competencies based on a considerably better integration of both general subjects and subjects of vocational theory and practice required often-closer cooperation between all teachers and trainers in a vocational school (Wisniewski et.al., 2003, p29).

Therefore, the development of a more sustainable competency profile TVET-teacher is crucial in order to develop the knowledge-based human resources that support the implementation of NDTS, especially in the context of MARA in Malaysia. The next sections (1.6 and 1.7), will discuss research goals and define a research question for the study.

1.6 Research goals

As a consequence of the research problem and current TVET status, this study sought to achieve six major goals. The purpose of this study is to explore expert panels, TVET-teachers and student's views with the intent of using this information to develop instrument and test an instrument through the following goals:

i. To develop a model for TVET-teacher competency profile;
ii. To validate the TVET-teacher competency profile being developed;
iii. To evaluate the level of competency among the TVET-teacher;
iv. To identify TVET-teacher competency gaps;
v. To identify TVET-teacher training needs; and
vi. To develop a framework for career development and training pathway.

1.7 Research question

In alignment with the researcher interest in developing an empirical based competency profile for the establishment of the framework for career development and training pathway of TVET-teacher at MARA, this study contributes to the research in science education by answering the following research questions. In pursuance on some challenges confronting the issues and problems regarding technical vocational education and training mention in previous chapter, this study sought answers to and is structured around six main research questions. The research questions are discussed as follows:

i. What are the elements of competencies required for TVET-teacher?
ii. How is the empirical based competency profile for MARA TVET-teacher in Malaysia?
iii. How are the TVET-teacher competency levels at MARA institution (IKM) in Malaysia?'
iv. What are the gaps of TVET-teacher competency between MARA institution (IKM) and other TVET institutions; their current strength and weakness?
v. How are the trainings needed for TVET-teachers at MARA?
vi. How are the frameworks for career development and training pathway of TVET-teachers in MARA institution?

Although there tends to be a one-to-one correspondence between the research questions and the research goals, it must be pointed out that the questions are not necessarily intended to set limits on what this study aimed to achieve. Rather, they are intended mainly (but not only) to provide a sharper focus for achieving the broader goals of this study.

1.7.1 Research question one

This section will explain the first research question;

'What are the elements of competencies required for TVET-teacher?'

This research question attempted to identify what are the elements of competencies that are required by TVET-teacher, especially at MARA. Before answering this research question, first we should understand the concept of competency. International Labour Organisation (ILO) provides a good categorisation of competency, that distinguishes between three approaches; competency as the ability to carry out tasks, personal attributes (attitudes and abilities), and the 'holistic competency' that includes the two previous ones (A 40 questions of labour competency, 2008).

In Malaysia, Department of Skill Development (DSD) use the German Occupational Competency Model as shown in figure 1.1, as a basic component required by the knowledge-based human resources.

OC = TC + LMC + HSC

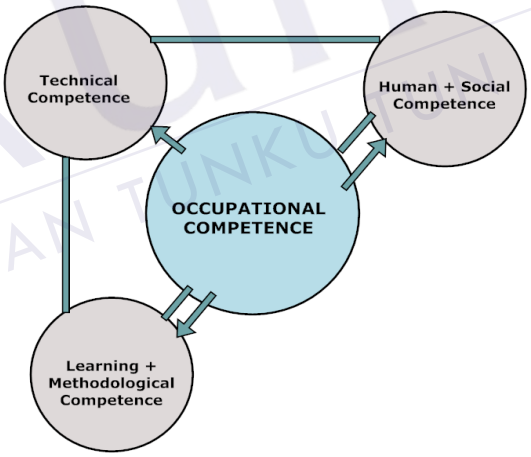

Figure 1.1: ITB-University Bremen Occupational Competency Model (Source: Bader; Spöttl, ITB-University Bremen)

This model is used in German TVET's sector in more than twenty years. The Standing Conference of the Ministries of Education and Cultural Affairs (KMK) is using this model in their curricular for TVET schools. By referring to this model; Occupational Competency (OC) comprised of three components; Technical Competency (TC), Learning and Methodology Competency (LMC), and Human and Social Competency (HSC). Reviews on several literatures, the researcher did not find any similar model suitable for TVET- teachers in Malaysia that cover the three core components of competency; technical, human and social, and learning and

methodological. Few models been developed recently, but all the models focused only on either general competency or technical competency separately.

Based on that model, the researcher also continued to review teacher standards from available models as a basic for developing MARA TVET-teacher competency profile. Many models available but the researcher only limited to twelve models from eight countries because these countries were major player in TVET.

1.7.2 Research question two

This section will explain the second research question;

'How is the empirical based competency profile for MARA TVET-teacher in Malaysia?'

This research question intended to establish the best possible method on how the empirical based competency profile for MARA TVET-teacher will be developed and validated. Several methods for developing a competency profile from the different perspective were reviewed. Wayne & Simpson (2013) has proposed four methods of competency profile development; expert panel brainstorming session, survey, interview and review worker's material and outputs. Davren (2010) does not deny that a competency profile could be developed through effective engagement and consultation with expert workshops and survey via email. Black & Riesen (2001) acknowledges of using the similar method in developing competency profile that involves; the collecting data through the brainstorming session, summarising and structuring, first validating by panels, synthesising and integrating, and second validating by panels. All scholars are agreed, the process of developing and validating the profile are involved in more than two stages.

In addition, Cane (2000) proposes the validating process could also involve surveying a representative sample of practitioners by asking them about the frequency of use, the importance, and ask them to propose any additional competencies; they need during their practice setting. Finally, Nelson (2001), Myint,et al. (2010), Hochstetle (2013), and Moaveni, et al. (2010) are recommended on using a modified Delphi method for competency profile development. Equally important, Yonghak (2009) agreed the use of the Delphi technique will help him to identify competencies needed. In his study, he is using a combination of quantitative and qualitative method consisting of a series of in-depth interviews to identify

competency need for current human-resource development (HRD) of master's degree graduate students in Korea.

The researcher wholeheartedly endorsed, based on above literatures and recommendation, a modified Delphi methodology is identified as a suitable method for this study. The detail's explanation of a modified Delphi methodology will be discussed in section 3.2.2.

1.7.3 Research question three

This section will explain the third research question;

'How are the TVET-teacher competency levels at MARA institution (IKM) in Malaysia?'

Measuring a teacher's competency is recognised as an important requisite to improve student's performance, teacher self-appraisal, and benchmarking teacher-teaching competency (Goh, 2011). Jones (1989) coined that the student ratings of a teacher's personality and teaching competency are significantly related. Besides that, there was a growing interest in assessing teacher competency prompted by demand for quality assurance and for greater recognition of the teaching profession (Vermunt & Verloop, 1999).

Although, various instruments have been developed to assess teachers at various stages in their professional careers in the context of selection, certification, and professional development (Dwyer, 1998), in some extend, the requirements of competency measurement instruments vary depending on the purpose of the assessment (Roelofs & Sanders, 2007).

Therefore, in this study, the teacher competencies will be evaluated using two methods; teacher self-evaluation (TSE) and supervisor evaluation (SVE). Because of the lack of literature-derived consensus on the best instrument, the researcher intents to develop his own instrument for teacher evaluation. The instruments were based on the elements of competencies found in the first research question and was further used to construct a teacher self-evaluation and supervisor evaluation questionnaires.

All instruments are based on rubric scale (Grubb, 1981; O'Donnell, Oakley, Haney, O'Neill, & Taylor, 2011; Mertler, 2001; Moskal & Leydens, 2000; Moskal, 2003). The instruments for teacher self-evaluation and supervisor evaluation are using five-point rubric scale. The reason why the researcher is deciding on using a

rubric scale because the set criterion is clearly defined as the range of acceptable or unacceptable performance and hence, it will reduce bias. Besides that, the criteria provide descriptions of each level of performance in terms of what teachers are able to do. Thus, we could assign labels (e.g., expert/mastery, proficient, moderate, basic and entry/novice) to these levels. According to Zimmaro (2004), rubric scale:

> …a systematic scoring guideline to evaluate performance (in these case teacher competencies) using a detailed description of performance standards thus it will provide consistent scores across all teachers, and allows assessors to be more aware of the expectations for performance and consequently, improve their performance (Zimmaro, 2004, p1).

1.7.4 Research question four

This section will explain the fourth research question;

'What are the gaps of TVET-teacher competency between MARA institution (IKM) and other TVET institutions; their current strength and weakness?'

The question attempted to identify teacher gaps namely; between MARA institution (IKM) and other institutions TVET institution in Malaysia, among different TVET institutions, and between the centres of the MARA institutions. This research question is also attempted to predict the significant predictors of TVET-teacher competencies in respect to teacher grade, age and year of experiences.

The absence of such a measurement and evaluation of teacher competency, it would be a challenge to address the gaps of their competencies and very difficult to plan a strategy for improving the effectiveness of their teaching. Later, it was the belief that the teacher participated in many professional development activities but had no specific measure of those activities and their effectiveness as they related to their teaching performance.

Bridging the gap between professional development training and classroom application was not always clearly identified or measurable. The competency profile develops for the TVET-teacher would provide a mechanism for measuring their strengths and weaknesses.

The competency profile that will be developed, on the other hand, offers an educational and assessment benefit. It also will be used as a guide in human-resource management and very useful career advancement (Hager, 1993).

1.7.5 Research question five

This section will explain the fifth research question;

'How are the trainings needed for TVET-teachers at MARA?'

Result from the analysis gap in the fourth research question is intent on identify TVET-teacher training need that answers this research question. According to Wojcicki (2003):

> …identifying teacher competency and rating them, teachers would be able to detect their particular strengths and weaknesses… and then map out a specific professional development plan for themselves (Wojcicki, 2003, p60).

Further clarification by Miller & Osinski (2002); claim that the training analysis is an importance function in the training and development activity. In addition, other scholar coins that the training need analysis (TNA) is also a mechanism that measures teacher effectiveness (Tasie, 2011). Swist (2000) does not deny that training needs analysis is conducted to determine; what training is relevant, what training will improve performance, and if training makes a difference. It is also intent on distinguish training needs from organisational problems and to link improved job performance with the organisation's goal.

Equally important, Miller & Osinski (2002) point-up need's assessment can be categorised into organisational analysis, task analysis and individual analysis. Indeed, some of the objectives for training needs are not only limited for identifying performance discrepancies, but teachers could be identifying their weaknesses and looking at the areas of improvement. This also links to an identified need for professional development in relation to student evaluations. In addition, teachers are generally accepting of formal student evaluations and they many see their potential for improvements (Spiller & Harris, 2013).

Consequently, to keep vocational curricula current and relevant to industrial needs TVET-teachers need to be at the very least and well informed on the methodology of analysing the competency needs directly and empirically in the world of work (Kurnia, Dittrich, & Ilhamdaniah, 2013).

1.7.6 Research question six

This section will explain the sixth research question;

'How are the frameworks for career development and training pathway of TVET-teachers in MARA institution?'

The study of gap analysis and teacher-training needs will help MARA to propose a compulsory in-service training program for the teachers; so that it will elevate the capacity of their knowledge and skills based on three components; technical competency, human and social competency, and learning and methodology competency. Therefore, MARA should develop a framework for career development and training pathway for the TVET-teachers.

The establishment of the teacher evaluation system and the professional development system (frameworks for career development and training) is necessary for developing teacher competency and building up long-term teacher effectiveness (Yin & Kwok, 1996). Moreover, the framework is an aid in selecting professional development activities related to teaching responsibilities (Pennsylvania Adult Teacher Competencies, 2001). Consequently, the establishments of the framework for career development and training pathway of the TVET- teacher are significant and relevant.

1.8 Hypotheses

In addition to the six research questions; five hypotheses were established for research question three (3) and four (4).

1.8.1 Hypothesis one

H_0: There is no significant difference between TSE and SVE.

H_A: There is a significant difference between TSE and SVE.

1.8.2 Hypothesis two

H_0: There is no significant difference in TVET-teacher competency gaps between MARA institution (IKM) and other TVET institutions in Malaysia.

H_A: There is a significant difference in TVET-teacher competency gaps between MARA institution (IKM) and other TVET institutions in Malaysia.

1.8.3 Hypothesis three

H_0: There are no significant differences in TVET-teacher competency gaps among TVET-institutions (IKBN, Giat MARA, Community College, IKM, ILP and other registered TVET centre) in Malaysia.

H_A: There are significant differences in TVET-teacher competency gaps among TVET-institutions (IKBN, Giat MARA, Community College, IKM, ILP and other registered TVET centre) in Malaysia.

1.8.4 Hypothesis four

H_0: There are no significant differences in TVET-teacher competency gaps among IKM in MARA.

H_A: There are significant differences in TVET-teacher competency gaps among IKM in MARA.

1.8.5 Hypothesis five

H_0: There are no significant relationship between TVET-teacher competency and teacher of difference grade, age and year of experience.

H_A: There are significant relationship between TVET-teacher competency and teacher of difference grade, age and year of experiences.

1.9 Significance of study

This study is significance and has its novelty as it represents, as far as the researcher has been able to ascertain, the first scholarly focuses on developing empirical based competency profile for TVET-teacher (an electrical teacher) for MARA in Malaysia. The development of the profile involved several stages; It established a list of elements of competency, validated the competency required and evaluate TVET-teacher competency.

Of equal importance, the establishment of competency profile provides a valuable tool for identifying specified skills, knowledge, attitude, and behaviour necessary to fulfilling a task, activity or career as the TVET-teacher at others TVET institutions in Malaysia. This profile provides a complete picture of the TVET-teacher's attribute, competencies, and serves as a tool for the communicating expectation of a TVET-teacher, development of curriculum that aligns with needs of the profession of TVET-teacher and assessing learning consistent with stakeholder expectation.

Although the primary focus of this study will be on the establishment of an empirical based competency profile for TVET-teacher, it is anticipated the findings of this study will be applicable to other teachers and TVET institutions. The competency profile develops for the teacher would provide a means by which they could gauge their strengths and weaknesses. This competency profile also offers educational and assessment benefits in such that will be used as a powerful guide to providers of professional education (Hager, 1993). Because it purposes to evaluate teacher competency, identify their competency gap and proposed a compulsory training.

Furthermore, the establishment of empirical based competency profile for TVET-teacher has a niche market to TVET institutions and corporate training centres (through consultancy projects). Apart from that, it could be used as; a mechanism to send out a clear message to everyone in the organisation about the behavioural indicators upon which they will be assessed, a tool for staff to understand easily and quickly the objectives and processes within the business and their own role and responsibilities relevant to it. It could be useful as a self-assessment for a teacher to track their competency development against a plan and see themselves develop, and this could be meaningful to them and boost their motivation.

Overall, the profile could be useful as a mechanism for identifying the training needs of teacher and assessment of the monetary value of applied learning and behaviour, a tool to assist in the selection and development of staff, and a mechanism to facilitate training, development and learning, making a measurable increase to performance and profits. This system has been accepted by big corporate organisations like PETRONAS in Malaysia, but not well established in the TVET institutions. Therefore, it has great commercialization potential in the TVET industry. It has the potential to serve as a benchmark study of current practice. To this end, it should prove of interest and value to practising managers and those seeking to improve the quality of training and their human resource, especially in TVET.

1.10 Framework of the study

Since the main purpose of this study is to develop an empirical based competency profile for TVET-teacher in MARA institution, all the relevance research question needs to be answered. Figure 1.2 shows the framework of this study on every stage during the competency profile development. It was clearly shown that the modified-Delphi process is used throughout this study would answer all the research questions. Elements of competency are derived as a result of the modified-Delphi process. During this process, both qualitative and quantitative data were analysed. Qualitative data is gathers from the expert panels based upon their knowledge and experiences. Besides that, the input of qualitative data in the Delphi process is gathered from literature reviews.

This framework explained the whole study research that involved the development of competency profile, evaluation of TVET-teacher competency, the analysis of TVET-teacher competency gaps, the analysis of TVET-teacher training needs, and the establishment of the framework of career development and training pathway. During the development stage, the TVET-teacher competency profile based upon the elements of the competencies is established and verified.

Therefore, it will answer the first three of research questions (RQ1, RQ2 and RQ3) that have been defined before. It follows that, the evaluation of TVET-teacher competency. Then all quantitative and qualitative data are analyses using an SPSS computer simulation package software and manual analysis respectively.

Lastly, the career development framework is established based upon the training needs as a result of competency gap analysis. The last stage towards the establishment of framework of career development and training pathway will answer three research questions RQ4, RQ5 and RQ6.

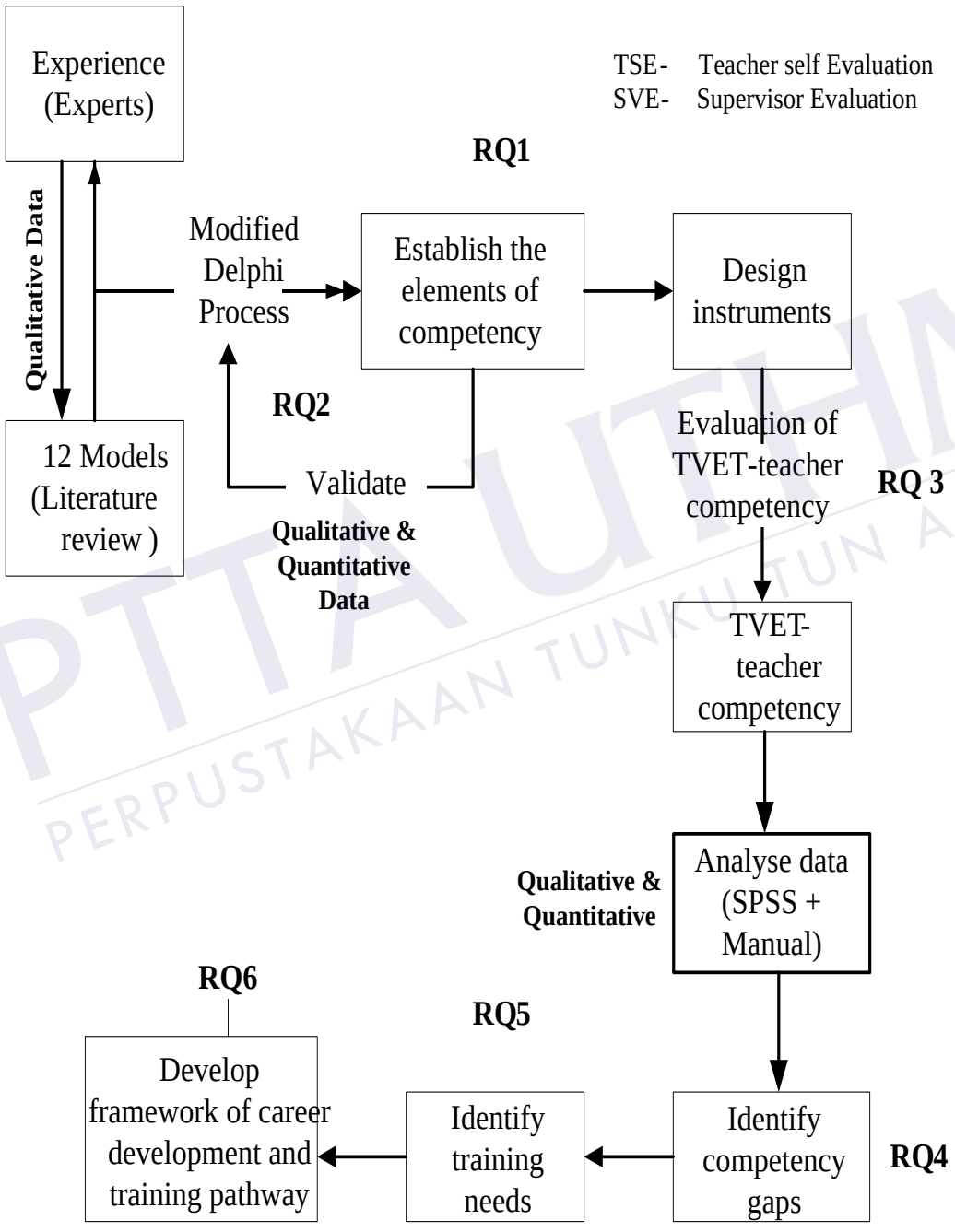

Figure 1.2: Framework of the study

1.11 Structure of the thesis

Easterby-Smith, Thorpe, & Lowe (1991) suggested a thesis could have a unified structure. The structures of this thesis follow the outline introduced by Perry (1998). Firstly, **Chapter 1** introduces the core research problem and then `sets the scene' and outlines the path that the examiner will travel towards the thesis' conclusion. The research itself as describe in each chapter are arranged as follows:

i. The research problem and propositions/hypotheses arising from the body of knowledge developed during previous research **(Chapter 2)**;
ii. Methods used in this research to collect data about the hypotheses **(Chapter 3);**
iii. Results of applying those methods in this research **(Chapter 4);**
iv. Discussion, interpretation of the findings and conclusions about the propositions/hypotheses and research problem based on the result's finding, including their place in the body of knowledge outlined previously **(Chapter 5).**

This thesis was arranged in such that introduced overall picture of the research in **Chapter 1**. That included the background of the study, brief discussion of TVET-teacher training in Malaysia, transformation of TVET in Malaysia, overview the current research status on teacher competency and human resource, discuss problem statements, outline the research goals, define research questions, outline the significant to the study, explain the framework of the study, and lastly outline the structure of the thesis.

Chapter 2 contextual the study within the relevant literature and provides its theoretical underpinning. The chapter begins with a review of several conceptions related to literature on TVET and how it related to the study namely; the holistic overview of TVET, discussion of TVET, issues and challenges, recruitment of TVET-teacher, system in Malaysia, and TVET in MARA. This is followed by a discussion on NDTS and Malaysia and in MARA and the discussion on the knowledge-based human resources in Malaysia for NDTS implementation such as the concept of the knowledge-based human resource, role of TVET-teacher as the knowledge-based human resources, needs of knowledge-based human resources for NDTS, strategies for developing knowledge-based human resources, and lesson learned at MARA institution. It also discussed on the model of TVET-teacher competency such as definition and concept of competency, competency profile, overview on teacher competency and teacher standard and discuss of reference

models of teacher competency. It further compared several TVET-teacher standards among countries, overview TVET-teacher competency and evaluation and competency profiling for the TVET-teachers, discuss the career development and training pathway for the TVET-teachers at MARA institutions, and lastly, give the summary for this chapter.

Chapter 3 obviously described the research methodology. It specifies the paradigm within which the study is located, its overall design, the conceptual framework, scope of study and research population, respondent, research instrument, data collections, test used for data analysis, and ethical consideration and limitation. In research design, it obviously explains the theory of triangulation, Delphi studied method, and the A-D-D-I (Analysis-Design-Development-Implementation) research designs phases. The chapter also explains sample setting, data collection and instrument, procedure for data analysis, and interpretation of teacher competency level. The procedures for data collection and analysis, and further highlights the validity and reliability measures adopted. Issues relating to research ethics (e.g. participants' rights to confidentiality, anonymity and informed consent) and how these were handled in this study are also discussed in this chapter. Data analysis procedure for each research question was evidently shown in table, together with the type of statistical test and expected results. This chapter ends with the interpretation of teacher competency.

Chapter 4 present and discuss the results of the analyses performed in chapter three and relate the findings to the literature reviewed in chapter two. The flow of this chapter is arranged according to the analysis of demographic data, the analyses of the results that seek answers to the six-research question, and the summarisation of the chapter.

Chapter 5 provides a comprehensive discussion and interpretation of the findings. This chapter attempts to realise the six goal of this study by seeking answers to the research questions. This concluding chapter provides a synopsis and summary of the major findings of the study. The chapter highlights the findings on the development and validation of the competency profile. The use of this profile for the establishment of a career development framework is also included. It further summarise of the finding, outlines the limitation of the study, offers some recommendations for further research, and ends with a final word of personal reflection overall research process.

REFERENCES

EDUCON 2011, Preparing TVET Educators for Next Generation. (2011). *Conference Report*. Kuala Lumpur: Department of Polytecnic, Ministry of Education Malaysia.

Evans, N., Whitehouse, H., & Hickey, R. (2012). Pre-service Teachers' Conceptions of Education for Sustainability. *Australian Journal of Teacher Education, 37(7)*, 1-12.

Garavan, T. N., & McGuire, D. (2001). Competencies and workplace learning. *Journal of Workplace Learning, 13(4)*, 144-163.

A 40 questions of labour competency. (2008). Retrieved data from CINTERFOR(ILO Latin America): http://www.cinterfor.org.uy/public/english/region/ampro/cinterfor/temas/complab/xxxx/index.htm

A modular curriculum. (2009). Retrieved May 24, 2011, from British Bible School : http://www.britishbibleschool.com/curriculum/modular/modular.html

A National Framework for Professional Standards for Teaching. (2003). *Published Standard*. Victoria, Australia: Institute for Teaching and School Leadership.

Abebe, A. (2010). Influences of Individual and Contextual Factors onImproving the Professional Development of TVET Teachers in Ethiopia . *Published PhD Thesis*. Kaiserslautern: Technische Universität Kaiserslautern.

Accreditation of New Scheme Teachers in NSW Government Schools Policy. (2012). New South Wales: New South Wales Goverment.

Agriculture & Food Processing Industry Skill Gap Analysis. (2002). Washington: University of Washington.

Agusyana, Y., & Yusoff, S. (2010). *Intepretation of Script Data and Research with SPSS 19.* Sri Kembangan, Malaysia: Synergy Media.

Ahmad Badawi, A. (2008). Malaysia Occupatioanal Skills Development and Training 2008-2020 Master Plan. *Key note address*. Putrajaya, Malaysia: Ministry of Human Resources.

Alhasan, N. U., & Tyabo, A. (2013). Revitalizing Technical and Vocational Education (TVET) for Youth Empowerment and Sustainable Developmen. *Journal of Educational and Social Research, 3 (4)*, 149-154.

Ali, A. (2001). Incentive and initiative provided for the implementation of employability skills in TVET: The Malaysian Experience. *Sixth Saudi technical conference & exhibition.* Riyadh.

Ali, M. (2005). Developing the K-Based Human Resources: A Study of Industrial Electronic Technology Curriculum at Kolej Kemahiran Tinggi MARA Pasir Mas. *Unpublished Thesis*. Shah Alam: UiTM Shah Alam.

Ali, M. (2008). Development the K-based Human Resources: Overview the Industrial Technology Education at MARA Training Institute. *The Second International Symposium on Educational Cooperation for "Industrial Technology Education"* (pp. 487-496). Kariya-city, Aichi: Aichi University of Education.

Ali, M., Kaprawi, N., & Razzaly, W. (2010). Developmet of a New Empirical Based Competency Profile for Malaysian Vocational Education and Training Instructors. *Proceedings of the 1st UPI International Conference on Technical and Vocational Education and Training* (pp. 108-117). Bandung: Universiti Pendidikan Indonesia.

Allee, V. (1997). Twelve Principles of Knowledge Managemant. Training and Development. *Journal of Knowledge Managemant, 11(3)*, 71-75.

Altbach, P. G. (Fall 2003). The Costs and Benefits of World-Class Universities. *International Higher Education*.

Ambe, B. A., & Agbor, C. E. (2014). Assessment of Teacher's Professional Competence, Teacher's Teaching Experience on the Implementation of Environmental Education Curriculum in Cross River State, Nigeria. *Journal of Educational and Social Research*, 521-527.

Anderson, J. D. (2006). Qualitative and Quantitative research. COE Imperial.

Ariadurai, S. A., & Manohanthan, R. (2008). Instructional Strategies in Teaching Engineering at a Distance: Faculty Perspective. *Volume 9, Number 2 June – 2008 Instructional Strategies in Teaching Engineering at a Distance: Faculty Perspective S. Anbahan Ariadurai and RajalingaInstructional Strategies in Teaching Engineering at a Distance Volume 9, Number 2*.

Arter, J. (1993). *Designing scoring rubrics for performance assessments: The heart of the matter.* Portland: Northwest Regional Education Laboratory.

ASCO 4311-11 Australian General Electrician. (2009). *Fact Sheet.* Australia: National Training Information Service.

Atwater, L. (1998). The advantages and pitfalls of self-assessment in organizations. In J. Smither, *Performance appraisal: State of the art in practice* (pp. 331-369). San Francisvo: Jossey-Bass Publishers.

Bauer, W. (2007). International Perpective on Teacher and Lecturer in TVE. *University Bremen-ITB Buletin*.

Bauer, W., & Gollmann, P. (2008). *Vocational Training Research for the Professionalisation of Vocational School Teacher.* Bremen: ITB, Uni-Bremen.

Bertrand, O. (1998). *Trend and Issues in Vocational Education and Training: A Perspective from Europe.* Retrieved from Organisation of Ibroamerican States of Education, Science and Culture Website: http://www.oei.org.co/iberfop/mexico4.htm#1

Beyer, B. K. (1995). *Critical thinking.* Bloomington, IN: Phi Delta Kappa Educational Foundation.

Bhargava, A. (2008). Research, Development and Commercialisation: Implications for Malaysia's High Education Sector. *National Higher Education Conference 2008.* Kuala Lumpur: Asian Executive Programs Sdn. Bhd.

Birnbaum, R. (2007, Spring). *No World-Class University Left Behind.* Retrieved October 28, 2008, from International Journal Education, online edition: http://www.bc.edu/bc_org/avp/soe/cihe/newsletter/Number47/p7_Birnbaum.htm

Bjekic, D., & Zlatić, L. (2006). Effects of professional activities on the teachers' communication competences development. *Co-operative Partnerships in Teacher Education: Proceedings of the31st Annual ATEE Conference* (pp. 163-172). Portorož, Slovenia: Association of Teacher Education in Europe.

BKT. (2007). Instrument for class monitoring TVET-teacher. *Unpublish manual*. Kuala Lumpur: Technical and Vocational Division, MARA.

Black, R., & Riesen, M. (2001). Towards a Competency Profile for the Professional Field of the Practice of the FELDENKRAIS Method. *IFF Research Journal*.

Bondar, S., & Demina, O. (2005). *Competency-based Training System for Teachers and Administration and Support Staff.* Ulyanovsk: Ulyanovsk State Technical University.

Bourgeois, J., Pugmire, L., Stevenson, K., Swanson, N., & Swanson, B. (2005). The Delphi Method: A qualitative means to a better future.

Braskamp, L. A., & Ory, J. C. (1994). *Assessing faculty work: Enhancing Individual and Institutional Performance.* San Francisco: Jossey-Bass Publishers.

Brown, B. L. (1999). Knowledge Worker Trend and Issues Alert. *Educational Resources Information Centre (ERIC) Publication, 18 (4)*, 4-23.

Bryman, A. (2001). *Triangulation.* Retrieved February 15, 2010, from http://www.referenceworld.com/sage/socialscience/triangulation.pdf

Bukit, M. (2012). Strengtening TVET-teacher education. *Report of the UNESCO-UNEVOC online conference*. Bonn, Germany: UNESCO-UNEVOC International Centre for TVET.

Bulbul, H. I. (2008). New Perspectives of Technology Education in Turkey. *The Second International Symposium on Education Cooperation for "Industrial Technology Education"* (pp. 473-479). Kariya-city, Aichi: Aichi University of Education.

Burke, G., & Reuling, J. (2000). Vocational Training and Lifelong Learning in Australia and Germany. *Australia Centre Series*.

Burns, N., & Grove, S. K. (2005). *The Practice of Nursing Research: Conduct, Critique, and Utilization.* St. Louis: Elsevier Saunders.

Byham, W. C. (2002). *Developing Dimension-Competency-Based Human Resource System.* Cornell University.

Caena , F. (2011). Education and Training 2020 Thematic Working Group ‘Professional Development of Teacher'. *Teachers’ core competences:Requirements and development*. European Commission.

Caena, F. (2013). Supporting teacher competence development for better learning outcomes. *Report*. European Commission.

Campbell, D., & Fiskel, D. (1959). Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix. *Psychological Bulletin, 56*, pp. 81-105.

Cane, D. (2006). The British Columbia Counselling Therapist Competency Profile: Validation in other Canadian Pronvince. British Columbia: Task Group for Councellor Regulation.

Carmeli, A. (2004). Strategic human capital and the performance of public sector organizations. *Scandinavian Journal of Management, 20(4)*, 375-392.

Celik, S. (2011). Characteristics and Competencies for Teacher Educators: Addressing the Need for Improved Professional Standards in Turkey. *Australian Journal of Teacher Education, 36(4).*

Chappell, C. S., & Hager, P. (1995). 1995 Problem-Based Learning and Competency Development. *Journal of Teacher Education, 20(1)*, 1-7.

Chinna, K., Karuthan, K., & Choo, W. Y. (2012). *Statistical analysis using SPSS.* Kuala Lumpur, MaLaysia: Pearson.

Christie, D., & Menter, I. (2009). Research Capacity Building: Scottish Collaborative Approaches. *Journal of Education for Teaching, 35 (4)*, 337-354.

Clayton, M. J. (1997). Delphi: A technique to harness expert opinion for critical decision-making tasks in education. *Educational Psychology*, 373-384.

Colton, S. B., & Hatcher, T. (2004). The Web-based Delphi Research Technique as a Method for Content Validation in HRD and Adult Education Research. *Unpublished Manuscript*. Monterey Peninsula College.

Competency Based Curriculum for Electrical Installation & Maintenance. (2009). *Published Curruculum*. Manila: Development Authority of Philliphine.

Competency Model & Dictionary. (2012). *Guideline*. Kuala Lumpur, Malaysia: Public Work Department.

Crawford, I. M. (1997). *Marketing research and information system.* Agriculture and Protection Department.

Creswell, J. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (3rd ed.).* Upper Saddle River, NJ: Pearson Education.

Creswell, J. W., & Clark, V. L. (2007). *Designing and Conducting Mixed Methods Research.* London: SAGE Publications.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16,*, 297-334.

Cushman, A., Fleming, M., Rosser, B., Hunter, R., & Harris, K. (1999). Retrieved from The knowledge management scenario: trends and directions for 1998-2003 : http://gartner6.gartnerweb.com/ggbin/ggtoc

Dalkey, C. N. (1969). *The Delphi Method: An Experimental Study of Group Opinion.* Santa Monica, CA: Rand Corporation.

Dalkey, N. C., Rourke, D. L., Lewis, R., & Snyder, D. (1972). *Studies in The Quality of Life: Delphi and Decision-making.* . Lexington: Lexington Books.

Dalkey, N., & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science, 9(3)*, 458-467.

Damooei, J., Maxey, C., & Watkins, W. (2008). *A Survey of Skill Gaps and Related Workforce issues in Selected Manufacturing Sectors: Report and Recommendations.* USA: Damooei, J., Maxey, C. and Watkins, W. (2008). A Survey of Skill Gaps and Related Workforce iWorkforce Investment Board of Ventura County.

Danielson, C. (1996). Enhancing Professional Practice: A Framework for Teaching. Alexandria, VA: Association for Supervision and Curriculum Development.

Darling-Hammond, L. (2002). *Access to Quality Teaching: An Analysis of Inequalities in California's Public Schools.* California: The Centre for the Future of Teaching and Learning.

Darling-Hammond, L. (2007, Winter). A Good Teacher in Every Classroom: Preparing the Highly Qualified Teachers Our Children Deserve. *educational HORIZONS*, pp. 111-132.

Darling-Hammond, L. (2008). *Evaluating Teacher Effectiveness: How Teacher Performance Assessments Can Measure and Improve Teaching.* Washington, DC: Centre of American Progress.

Dasmani, A. (2011). Challenges facing technical institute graduates in practical skills acquisition in the Upper East Region of Ghana. *Asia-Pacific Journal of Cooperative Education, 12(2)*, 67-77.

Davies, B., & Ellison, L. (1997, Jan 1). School Leadership for the 21st Century: A Competency and Knowledge Approach. *Psychology Press*.

Davren, M. (2010). Project to develop a Competency Profile for Nurses and Midwives: promoting the mental health and wellbeing of children and young people. *Final Report*. Belfast: Northern Ireland Practice and Education Council for Nursing and Midwifery.

Deitmer, L., & Heineman, L. (2003). *Skills Demanded in University-Industry-Liaison (UIL).* Bremen: Institut Technik + Bildung-Universitat Bremen.

Delbecq, A., Van de Ven, A., & Gustafon, D. (1975). *Group Technique for Program Planning: A guide to Nominal Group and Delphi Process.* . Glenview: Scott-Foresman.

Denzin, N. K. (1970). *The Research Act in Sociology.* Chicago: Aldine.

DeVellis, R. F. (2003). *Scale development: Theory and applications (2nd ed.).* Thousand Oaks, CA: Sage Publications.

Diane, G., & Irène, L. T. (2003). The german dual apprenticeship system analysis of its evolution and present challenges. *Labour Education and Training Research Report*. York University.

Dittrich, J. (2006). *Toolbox for VET and Innovation.* Bremen City: ITB, Universitat Bremen.

Dittrich, J., Md Yunos, J., Spottl, G., & Bukit, M. (2009). *Standardisation in TVET Teacher Education.* Frankfurt: Peter Lang, Internationaler Verlag der Wissenschafen.

Donald, C. (2006). Standard For Chartered Teacher In Scotland: New Context For The Assessment and Professional Development of Teachers. *Studies In Educational Evaluation, 32*, 53-72.

Drucker, P. F. (1992). *The Age of Discontinuity.* London: Transaction.

Drucker, P. F. (1994). *The age of social transformation.* Retrieved from http://www.theatlantic.com/atlantic/politics/ecbig/soctrans.htm

Drucker, P. F. (1998). *The Coming of the New Organization. Knowledge Managemant.* USA: Harvard Bussiness School Press.

Drucker, P. F. (1999). Knowledge worker productivity: the biggest challenge. *California Management Review Reprint Series, 41(2)*.

Dwyer, C. A. (1998). Psychometrics of Praxis III: Classroom performance assessments. *Journal of Personnel Evaluation in Education,12(2)*, 163-187.

Easterby-Smith, M., Thorpe, R., & Lowe, A. (1991). *Management Research: an Introduction.* London: Sage.

Electrical Program Outline. (2009). *Brochure*. USA: Thomson Institute.

Electrical Trade Competency profile. (2004). *Guideline*. USA: Missouri Centre for Career Education.

Fah, L. Y., & Hoon, K. C. (2009). *Introduction to Computer Analysis with SPSS 16.0 for Windows.* Selangor, Malaysia: Venton Publishing.

Fischer, M., & Bauer, W. (2007). Competing approaches towards work process orientation in German curriculum development. *European journal of vocational training, 40(1)*, 140-157.

Fouka, G., & Mantzorou, M. (2001). What are the Major Ethical Issues in Conducting Research? Is there a Conflict between the Research Ethics and the Nature of Nursing? 5(1). *Health and Science Journal*, 3-14.

French, P., Psychol, C., Yin, y. h., & Lee, L. (2002). A Delphi survey of evidence-based Nursing Priorities in Hong Kong. Journal of Nursing Management. *Journal of Nursing Management, 10* , 265-273.

General Electrical Competency Standard. (2009). *Fact Sheet*. Australia: National Training Information Service.

George, T. (2006, August 22nd-23rd). Training for the Trainers Towards Continuous Development in Human Resources. *Key Note Speaker of Quality in TVET: Issues and Challenges Towards Human Capital Development*. Johor Bahru, Malaysia: Ministry of Human Resources.

Gerald, B., & Jochen, R. (2000). Vocational training and lifelong learning in Australia and Germany.

Gessler, M. (2008). *SPSS Quantitative Research Methods: PhD Seminar.* Bremen: ITB-University Bremen.

Ghazali, M. F. (2008). Teacher training. *Personal communication.*

Gilbert, F. T. (1978). *Human Competence-Engineering Worthy Performance.* New York: McGraw-Hill Book Company.

Gliem, J. A., & Gliem, R. R. (2003). Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Like. *Presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education* (pp. 82-88). Columbus, OH: The Ohio State University.

Goh, P. S. (2011). Improving teacher competence through the new Malaysian Teacher Standards: Exploring the challenges for teacher educators. *Journal of Research, Policy & Practice of Teachers & Teacher Education, 1(1)* , 88-99.

Gonczi, A., Hager, P., & Oliver, L. (1990). Establishing competency-based standards in the professions. *Research Paper No. 1, National Office of Overseas Skills Recognition, DEET*. Canberra, Australia: Australian Government Publishing Service.

Goodrich, A. H. (1997). Understanding rubrics. *Educational Leadership, 54(4).*

Gordon, R., Kane, T. J., & Staiger, D. O. (2006). Identifying effective teachers using performance on the job. *The Hamilton Project-Discussion paper*. Washington DC: The Brookings Institution.

Gordon, T. J. (1994). *The Delphi Method.* Washington, DC: American Council for the United Nations University.

Graduating Teacher Standard. (2009). *Guidelines*. Aotearoa, New Zealand: New Zealand Teacher Council.

Griffin, P., Thi Kim Cuc, N., Gillis, S., & Thanh, M. T. (2006). An Empirical analysis of Primary Teacher. *Planning and Changing Vol. 37, No. 1&2,* 71-92.

Griffin, S. (2005). *Management.* Boston: MA: Houghton Mifflin Company.

Grubb, M. (1981). *Using Holistic Evaluation.* Encino,Cal: Glenco Publishing Company, Inc.

Guion, L. A., Diehl, D. C., & McDonal, D. (2002). Triangulation: Establishing the Validity of Qualitative Studies. *University Internal Circulation*. Florida: University of Florida.

Hager, P. J. (1993). Conceptions of Competence. *Philosophy of Education*.

Halasz, I. M. (1994). Overview of DACUM Job Analysis Process. Longmont: NIC Academy Division.

Hamid, H. (2000, July). Training of Knowledge Staff Must be Stepped-up. *Human Resource Buletin.*

Harris, K. (1999). *So, you're a knowledge worker: what do you do all day.* Retrieved from http://gartner6.gartnerweb.com/ggbin/ggtoc

Hashim, N. R. (2005). The Initiatives in Promoting Technical and Vocational Education: Completing the Bigger Picture in Educational Progress. *The National Technical & Vocational Ceference.* Kuala Lumpur: Ministry of Human Resources.

HayGroup. (2002). Project to Develop Competency Model To Suppor tHuman Resource Management Information System (HRMIS) Under the Public Service Department. *Report*. Kuala Lumpur: HayGroup.

Heck, R. H. (2009). Teacher effectiveness and student achievement: Investigating a multilevel cros-classified model. *Journal od Educational Administration, 47(2),* 227-249.

Heiskanen, E., Järvelä, K., Pulliainen, A., Saastamoinen, M., & Timonen, P. (2008). Qualitative Research and Consumer Policy: Focus Group. *The Qualitative Report Volume 13 Number 2*, 152-172.

Hochstetle, A. (2013). *Modified Delphi Technique For Validating International Park Competencies.* Retrieved from The Eppley Institute: http://eppley.org/modified-delphi-technique-used-to-validate-international-park-competencies/

Hodgkinson, C. (1996). *Administrative Philosophy.* Oxford, UK: Elsevier-Pergamon.

Hoelscher, M. (2005). Vocational programmes in German higher education and their role for the economy: Some thoughts in European Comparative Perspective. *The International Seminar on Vocational Content in Mass Higher Education? Responses to the Challenges of the Labour Market and the Work-Place.* Bonn, Italy.

Hoffman, T. (1999). The Meaning of Competency. *Journal of European Industrial Training. Vol.23(6),* 275-286.

Holtzhausen, S. (2001). Triangulation as a powerful tool to strengthen the qualitative research design: The Resource-based Learning Career Preparation Programme (RBLCPP) as a case study. *Education Online*.

Hsu, C.-C., & Sandford, B. A. (2007). The Delphi Technique: Making Sense of Consensus. *Practical Assessment, Research & Evaluation, 12(10),* 1-8.

Implementation of "Education and Training 2010" work Programme. (2004). *Progress report. Working group. "Improving the education of teachers and trainers"*. Brussels: European Commission. Diectorate-General for Education and Culture.

Improving teacher competency and teaching effectiveness in the Pacific. (2010). *For Education Ministers' Meeting*. Port Moresby, Papua New Guinea: Pacific Islands Forum Swcretariat.

Ingvarson, L. (1998). Professional development as the pursuit of professional standards: the standards-based professional development system. *Teaching and Teacher Education, 14(2),* 127-140.

Ismail, A., Spottl, G., & Md Yunos, J. (2014). The Development of New Malaysian Skills Qualification Framework (MSQF) in the Context of National dual Training System (NDTS). *Published Thesis*. Batu Pahat, Johor, Malaysia: UTHM.

Israel, R. G. (2009). *Determine Sample Size.* Retrieved from EDIS: http://edis.ifas.ufl.edu

ITB-University Bremen Occupational Competency Model (Source: Bader; Spottl). (2008). ITB-University Bremen.

James, J., & Singh, N. (2004). *Massachusetts Skills Gap Project.* Massachusetts: Massachusetts Division of Workforce Development & Commonwealth Corporation.

Jegede, P. O. (2009). Age and ICT-related Behaviours of Higher Education Teacher in Nigeria. *Issues in Informing Science and Information Technology, Vol 6*, 765-774.

Jia, R. W., & Wen, L. S. (2008). Exploring the information literacy competence standards for elementary and high school teachers. *Computers & Education,Vol 50*, 787-806.

Jones, J. (1989). Students' ratings of teacher personality and teaching competence. *Higher Education 18*, 551-559.

Jubb, R., & Rowbotham, D. (1997). Competences in management Development:challenging the myths. *Journal of European Industrial Training, Vol.21 No.5*, 5-171.

Kaiser , H. F. (1974). An index of factorial simplicity. *Psychometrika, 39(1)*, 31-36.

Kaslow, N. J., Borden, K. A., Collins, F. L., Forrest, L., Illfelder-Kaye, J., & Nelson, P. D. (2004). Conpetencies Conference: Future direction in education and credentialing in professional psychology. *Journal of Clinical Psychology, 80*, 699.

Kember, D., Leung, D. Y., & Kwan, K. P. (2002). Does the use of Student Feedback Questionnaire Improve the Overall Quality of Teaching. *Assessment & Evaluation in Higher Education, 27(5)*, 411-425.

Khan, A. (2008). ICT Competency Standard for Teacher. *Competency Standard Module*. United Kingdom: UNESCO.

Kingdon, G. G. (2007). The progress of school educatoion in India. *Oxford Review of Economic Policy, 23(2),* 168-195.

Kit, C. P., & Graham, J. (2008). Research, Development and Commercialisation: Implications for Malaysia's High Education Sector. *National Higher Education Conference 2008.* Kuala Lumpur: Asian Executive Programs Sdn. Bhd.

Kline, R. B. (2005). *Principles and practice of structural equation modeling (2nd ed.).* New York: Guildford.

Klink, M. v., Boon, J., & Schlusmans, K. (2007). Competences and vocational higher education: Now and in future. *European journal of vocational training, 40(1)*, 67-82.

Knowles, M. (1975). *Self-directed Learning.* New York: Association Press.

Ko, S., & Rosen, S. (2001). *Teaching online: A practical guide.* Boston: Houghton Mifflin.

Koch, M. (2003). K-Worker Occupational Competence. *Working Paper in Action Oriented Learning-Trainee Centered Teaching: In services Technical Teacher Training at GMI Programme Semionar*. Malaysia: Dual System Project (DSP), GMI and KUiTTO.

Koster, B., Brekelmans, M., Korthagen, F. A., & Wubbels, T. (2005). Quality requirements for teacher educators. *Koster, B., Brekelmans, M., Korthagen, F. A. J., & Wubbels, T. (2005). Quality requirements for teacher educators. Teaching and Teacher Education, 21(2),* 157-176.

Krejcie, R. V., & Morgan, D. W. (1970). Determine Sample size for Research Activities. *Educational and Phychological Measurement, 30(1)*, 607-610.

Krogh, G. v., & Roos , J. (1966). *Managing Knowledge: Perspectives on Cooperation and Competition.* London: SAGE Publication.

Kruger, D. J. (2003). Intergrating quantitative and qualitative methods in communitity research. *The Community Psychologist*, 18-19.

Kurnia, D., Dittrich, J., & Ilhamdaniah. (2013). Occupational competence needs analysis as a basis for TVET curriculum development. *TVET Online Asia, Issue 2*.

Lauglo, J. (2006). Research for TVET policy development. *Development and Implementation of Master Degree Standard for Teacher and Trainer in Technical Vocational Education and Training (TVET) in East and South East Asia.* Bonn: Inwent.

Lee, M. (2008). Rethinking Leadership Practices in Higher Education: Developing a Holistic Outlook. *National Higher Education Conference 2008.* Kuala Lumpur: Asian Executive Programs Sdn. Bhd.

Leeuw, A., & Seegert, V. (2007, May). Putting Feet on Research:Applying Skill Pathway Analysis to Workforce Development. *In Context- Indiana Workforce & Economy Bulletin*.

Lepani, B. (1995). Vocational Education and Training (VET) 2005. *A Discussion Paper on the Roles and Competencies of the VET Teacher in Year 2005*. Sydney, Australia: Department of Education and Training.

Liakopoulou, M. (2001). The Professional Competence of Teachers: Which qualities, attitudes, skills and knowledge contribute to a teacher's effectiveness? *International Journal of Humanities and Social Science, 1(21),* 66-78.

Linstone, H., & Turoff, M. (1975). *The Delphi method: Techniques and applications.* Reading: MA: Addison-Wesley.

Longworth, N. (1999). *Making Lifelong Learning Work: Learning Cities for a Learning Century.* London: Kogan Page.

Loup, K. S., & Ellett, C. D. (1997). *Looking Backwards With the Personnel Evaluation Standards: An Analysis of the Development and Implementation of a Statewide Teacher Assessment Program.* Chicago: American Educational Research Association.

Ludwig, B. (1997). Predicting the future: have you considered using the Delphi methodology? Journal of Extension. *Journal of Extension*.

M. Sail, R., Md. Aroff, A., Abu Samah, A., Hamzah, A., & Mohd Noah, S. (2008). *Handbook on Social Skills and Social Values in Technical Education and Vocational Training.* Putrajaya: Ministry of Human Resouces.

MacDonald, S., Nink, C., & Duggan, S. (2010). Principles and Strategies of a Successful TVET Program. *Management & Training Corporation*. Centerville, UT: MTC Institute.

MacDonald, S., Nink, C., & Duggan, S. (2010). *Principles and Strategies of a Successful TVET Program.* Centerville, UT: Management & Training Corporation (MTC) Institute.

Macleana, R., & Pavlovab, M. (2011). Skills development for employability (TVET) in higher education: issues and challenges. *Journal of Asian Public Policy, 4(3),* 321-330.

Majlis Amanah Rakyat Yearly Report. (2003). Kuala Lumpur: MARA.

Majumdar, S. (2011). Teacher Education in TVET: Developing a New Paradigm. *International Journal of Training Research, 9(1/2),* 49-59.

Malaysia & the Knowledge Economy: Building a World Class Education System. (2007). *Document*. East Asia: World Bank.

Malaysia Occupatioanal Skills Development and Training 2008-2020 Master Plan. (2008). Putrajaya, Malaysia: Ministry of Human Resources.

Malaysia Qualification Framework. (2009). *Handbook*. Selangor, Malaysia: Malaysia Qualifications Agency.

MARA Strategic Plan 2011-2020. (2010). *Handbook*. Kuala Lumpur: MARA.

Marelli, A. F., Tondora, J., & Hoge, M. A. (2005). Strategies for developing competency model. *Administration and Policy in Metal Health, 32*, 533-561.

Marinković, S., Bjekić, D., & Zlatić, L. (2012). Teachers' Competence as the Indicator of the Quality and Condition of Education. *Project Paper Report*. Serbia: University of Kragujevac.

Marsh, H. W., & Roche, L. A. (1997). Making students' Evaluation of Teaching Effectiveness Effective: The Critical Issues of Validity, Bias, and Utility. *American Psycologist, 52(11)*, 1187-1197.

Matemba, A. D. (2008). Status of Technology Educaion in Technical Colleges ion Malawi. *The Second International Symposium on Education Cooperation for " Industrial Technology Education"* (pp. 437-445). Kariya-city, Aichi: Aichi University of Education.

Mcmillan, J. H. (1996). *Educational Research Fundamentals for the Consumer Second Edition* . New York: HarperCollins CollegePublishers.

McMillan, J. H., & Wergin, J. F. (2009). *Understanding and Evaluating Educational Research (4th Edition).* New York: Pearson.

Md Nasir, A., Ali, D., Noordin, M., & Nordin, M. (2011). Technical skills and non-technical skills. Predefinition concept,. *Proceedings of the IETEC'11 Conference.* Kuala Lumpur, Malaysia.

Md Yunos, J. (2010). Transnational Standards Design Framework for TVET Teacher Training Program. *Education for Sustainable Development in TVET* (pp. 227-237). Batu Pahat: Universiti Tun Hussien Onn Malaysia.

Md Zain, Z. (2005). Fulfilling The National Agenda: A Review of 8th Malaysia Plan for the Technical and Vocational Education. *The National Technical & Vocational Conference.* Kuala Lumpur: Ministry of Human Resources.

Medina, R. (2010). Upgrading yourself—technical and nontechnical competencies. *IEEE Potentials,29(1)*, 10-13.

Meissner, H. I. (2010). The Nature and Design of Mixed Methods Research. In J. W. Creswell, A. C. Klassen, V. L. Clark, Clark, & K. C. Smith, *Best Practices*

for Mixed Methods Research in the Health Sciences (pp. 4-10). Nebraska-Lincoln: Office of Behavioral and Social Sciences Research.

MERIC. (2008). *Missouri Skills Gaps.* USA: Missouri Economic Research & Information Center.

Merriam, S. B. (2002). Introduction to Qualitative Research. In S. Merriam, & Associate(eds.), *Qualitative Research in Practice: Example for discussion and analysis* (pp. 3-17). San Francisco, CA: John-Wiley & Sons.

Mertler, C. A. (2001). Designing scoring rubrics for your classroom. *Practical Assessment, Research & Evaluation, 7(25).*

Mijangos-Noh, J. C., Canto-Herrera, P. J., & Cisneros-Cohernour, E. J. (2007). A competency model for determining the professional profiles of faculty at Teacher Preparation Schools in Southern Mexico. *Unpublished Thesis*.

Miller, J. A., & Osinski, D. M. (2002, July). *Training need assessment.* Retrieved from Internal Society for Performance Improvement: http://www.ispi.org/pdf/suggestedReading/Miller_Osinski.pdf

Miller, W. R. (1990). *Teacher and Their Jobs.* Homewood: American Technical Publisher.

Mior Shahrudin, A. (2009). *The next generation of teachers: the Malaysian.* Kuala Lumpur: Teacher Professional Development Sector, Ministry of Education Malaysia.

Mississippi Curriculum Framework for Electrician. (1995). Jackson, Mississippi: Mississippi Department of Education.

MLVK. (2005). Buku Panduan Pelaksanaan Sistem Latihan Dual Nasional (Guideline for the Implementation of NDTS) . Kuala Lumpur, Malaysia: National Technical and Vocational Council.

Mndebele, C. B. (1997). Competence-based teacher education programmes in Swaziland. *Education + Training, 39(6),* 237-241.

Moaveni, A., Gallinaro, A., Conn, L. G., Callahan, S., Hammond, M., & Oandasan, I. (2010). A Delphi approach to developing a core competency framework for family practice registered nurses in Ontario. *Nurs Leadersh, 23(4),* 45-60.

Mohamad, M. M., Saud, M. S., & Ahmad, A. (2011). The Need in Training and Retraining for TVET Teachers in Malaysia. *Journal of Technical Education and Training*, 51-57.

Mohd Fahmi, Z. (2008). Quality Assurance in Higher Education: Future Consideration. *National Higher Education Conference 2008.* Kuala Lumpur: Asian Executive Programs Sdn. Bhd.

Mohd Sani, A. (2005). Technical and Vocational Education as a Key Components of National Development: Making Education for All a Reality. *The National Technical & Vocational Conference.* Kuala Lumpur: Human Resource Department.

Mondy, R. W., Noe, R. M., & Premeaux, S. R. (2002). *Human Resource Management, Eight Edition.* New Jersey: Prentice Hall.

Morales, A. (2005). Family dynamics of Latino languange broker: A mixed methods study. *Unpublished manuscript*. Lincoln: University of Nebraska.

Morse, J. M. (1991). Approach to qualitative-quantitative methologogical triangulation. *Nursing Research, 40,* 10-123.

Moskal, B. M. (2003). Recommendations for developing classroom performance assessments and scoring rubrics. *Practical Assessment Research & Evaluation, 8 (14).*

Moskal, B. M., & Leydens, J. A. (2000). Scoring rubric development: Validity and reliability. *Practical Assesement Research and Evaluation, 7(10).*

MQA. (2008). Code of Practice for Program Accreditation (COPPA). An Overview of Malaysian Higher Education Quality Assurance System. *Roadshows Malaysian Qualification Framework.* Putrajaya: MQA (2008a). Code of Practice for Program Accreditation (COPPA). An Overview of Malaysian Higher EMalaysia Qualification Agency.

Mullens, J. E. (n.d). Using qualitative methods to validate quantitative survey instruments. *Unpublished notes*. Washington DC: National Center for Education Statistics.

Myint, J., Edgar, D. F., Kotecha, A., & Crabb, D. P. (2010). Development of a competency framework for optometrists with a specialist interest in glaucoma. *Eye, 24(9),* 109-1514.

Nelson, A. J. (2001). Using a modified delphi methodology to develop a competency model for VET practitioners 2002. *Unpublished research*. Winona.

Ng, C. J. (2006). Designing a questionnaire. *Malaysian Family Physician, 1(1),* 32-35.

Nicoalazzo, P. (n.d.). *Teacher Skills and Competency Versus Program Design.* Retrieved from The Wilderness Medicine Training Center: http://www.WildMedCenter.com

Norton, R. E. (1997). *DACUM handbook.* Columbus, OH: Ohio State University.

Nunnaly, J. (1978). *Psychometric theory.* New York: McGraw-Hill.

NVQs in Electricity System Technology Engineering. (2006). *Qualification Handbook.* London, United kingdom: City & Guild.

NVTC. (2005). Implementation of the National Dual Training System. *Guides and Rules. 2nd. edition*. Putrajaya.

O'Donnell, J., Oakley, M., Haney, S., O'Neill, P. N., & Taylor, D. (2011). Rubrics 101: A Primer for Rubric. *Jounal of Dental Education, 75(9),* 1163-1175.

O'Hanlon-Rose, T. (2008). The Skill Gap: What it is and How do you close it? *Asia Pacific Technical HRD Conference and Career Expo-08* (p. 30). Kuching: International College of Advanced Technology Sarawak, Malaysia.

Okoli, C., & Pawlowski, S. D. (2004). The Delphi method as a research tool: an example, design consideration and applications. *Information & Management 42,* 15-29.

Olsen, W. (2004). Triangulation in Social Research: Qualitative and Quantitative Method Can Realy Be Mixed. In M. Hoborn, *Development in Socialogy.* Ormskirk: Causeway Press.

Omar, M. S., & Paryono. (2008). Current VTET Issues and Challenges in Southeast Asia: SEAMEO VOCTECH's and the Member Countries' Response. *Asia Pacific Technical HRD Conference and Career Expo-08.* Kuching, Sarawak Malaysia: International College of Advanced Technology Sarawak.

Orr, J. E., Sneltjes, C., & Dai, G. (2010). Best Practice in Developing and Implementing Competency Models. *The Korn Ferry Institute* , pp. 8-9.

Oser, F., Salzmann, P., & Heinzer, S. (2009). Measuring the competence-quality of vocational teachers: An advocatory approach. *Empirical Research in Vocational Education and Training, 1,* 65-53.

Oser, F., Salzmann, P., & Heinzer, S. (2009). Measuring the competence-quality of vocational teachers:An advocatory approach. *Empirical Research in Vocaional Education and Training,* 65-83.

Paliwoda, S. J. (1983). Predicting the future using Delphi. *Management Decision 21 (1),* 31-38.

Pang, C. L. (2011). Key Reforms in Revitalising Technical and Vocational Education Training (TVET) in Malaysia. *Regional Conference HRD through TVET as a Development Strategy in Asia.* Colombo.

Parry, S. R. (1996). The Quest for Competency. *Training Journal, July*, 48-56.

Pennsylvania Adult Teacher Competencies. (2001). *User's Guide*. Pennsylvania: Department of Education.

Perry, C. (1998). A structured approach for presenting research theses. *Australasian Marketing Journal, 6(1),* 63-86.

Phang, C. L. (2001, November 20). Defining K-Worker and K-Manager. *INTech section page 3*. Kuala Lumpur: The Star Newspaper.

Piaw, C. Y. (2008). *Basic Research Statistics -Ordinal and Norminal data analysis.* Kuala Lumpur: Mc Graw Hill Education.

Piaw, C. Y. (2009a). *Advanced Research Statistics -Regression, Factor Analysis and SEM Analysis.* Kuala Lumpur: Mc Graw Hill Education.

Piaw, C. Y. (2009b). *Advanced Research Statistics -Univariat and Multivariat Test.* Kuala Lumpur: Mc Graw Hill Education.

Pillay, G. F. (2005). *Technical & vocational education (TVET) systems of selected East Asian countries: Malaysia.* Washington DC: The World Bank.

Professional Standards for Teachers in England from September 2007. (2007). Retrieved April 11, 2009, from Training and Development Agency for Schools: http://www.tda.gov.uk/upload/resources/pdf/i/introduction_to_standards.pdf

Punch, K. F. (2006). *Developing Effective Research Proposals, 2nd Edition.* London: SAGE Publications Ltd.

Quality Indicators of Transnational Standard. (2010). *Handout for PhD Seminar on TT-TTVET Projects*. Bremen: ITB, Uni-Bremen.

Quisumbing, L. R. (2001). The importance of values education for TVET and its economic and human resource development program. *UNESCO Asia Pacific Conference.* Adelaid: Asia Pacific Network for International Education and Values Education.

Rashidi, R. (2013). Evaluation of collaboration between public training institutions and private industries and its importance in improving the quality of training delivery in TVET in Malaysia. *In: TVET@Asia, issue 1, 1-17. Online: http://www.tvet-online.asia/issue1/rashidi_tvet1.pdf.*

Rauner, F. (2007). Practical knowledge and occupational competence. *European journal of vocational training, 40(1)*, 52-66.

Rauner, F., & Dittrich, J. (2006). Increasing the Profile and Professionalisation of the Education of TVET Teachers. In F. Bünning, & Z.-Q. Zhao, *TVET Teacher Education on the Threshold of Internationalisation* (pp. 35-42). Bonn: InWEnt – Internationale Weiterbildung und Entwicklung gGmbH.

Reagan, G. M., & Pratte, R. N. (1973). An Understanding of Schools: An Aspect of Teacher Competence. *Theory into Practice, 12(1)*, 1-4.

Riegel, C., & Dallas, M. (1998). *Hospitality and Tourism: Career a Blueprint for Success.* New Jersey: Prentice Hall.

Roelofs, E., & Sanders, P. (2007). Towards a framework for assessing teacher competence. *European journal of vocational training, 40(1)*, 123-139.

Rolyak, A., & Ogienko, O. (2009). Model of Professional Teachers Competences Formation: European Dimension. Ukraine: Institute for Education Studies & Adult Education of the Academy of Pedagogical Science.

Ross, J. A., & Bruce. , C. D. (2007). Teacher self-assessment: A mechanism for facilitating professional growth. *Teaching and Teacher Education, 23(2)*, 146-159.

Ross, K. N. (2005). Educational research: some basic concepts and teminology. *Module*. Paris, France: International Institute for Educational Planning/UNESCO.

Rowe, G., & Wright, G. (1999). The Delphi technique as a forecasting tool: Issues and analysis. *International Journal of Forecasting, 15*, 353-375.

Rowe, K. (2003). The Importance of Teacher Quality As A Key Determinant of Students' Experiences and Outcomes of Schooling. *2003 - Building Teacher Quality: What does the research tell us?* (pp. 15-23). Australian Council for Educational Research.

Sachs, R. (2005).

Salkind, N. J. (2000). *Exploring Research, Fourth Edition.* New Jersey: Prentice Hall.

Sam, C. V. (2012). *TVET teacher education in Vietnam-vision to 2020.* Hanoi: Ministry of Labour-Invalids and Social Affairs.

Santiago, P., & Benavides, F. (2009). Teacher Evaluation: A Conceptual Framework and examples of Country Practices. *Paper at OECD-Mexico Workshop*. Mexico City: OECD.

Scheetz, N. A., & Martin, S. D. (2006). Teacher Quality: A Comparison of National Board-Certified and Non-BoardCertified Teachers of Deaf Students. *American Annals of the Deaf, Volume 151, Number 1,*, 71-87.

Schilling, M. A. (2000). Towards a general modular systems theory and its application to inter-firm product modularity. *Academy of Management Review*, 312–334.

Senge, P. M., Kleiner, A., Smith, B. J., Roberts, C., & Ross, R. B. (1994). *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization.* New York: Doubleday Publishing.

Shamsuri, S. (2004). *Research Methods for the Social Sciences -made simples.* Selangor, Malaysia: DSS Publishing Enterprise.

Shamsusi, S. (2004). *Research Methods for the Social Sciences: Made simple.* Selangor: DSS Publishing Enterprise.

Sherman, R., Dobbins, D., Tibbets, J., Crocker, J., & Dlott, M. (2002). *Teacher Competencies Assessment Instrument. Building Professional Development Partnerships for Adult Educators Project.* California: American Institutes for Research.

Shih, F. (1998). Triangulation in Nursing Research: Issues of Conceptual Clarity and Purpose. *Journal of Advanced Nursing, 28(3)*, 631-641.

Sieber, S. D. (1973). The integration of fieldwork and survey methods. *American Journal of Sociology, 73*, 1335-1359.

Skulmoski, J. G., Hartman, T. F., & Krahn, J. (2007). The Delphi Method for Graduate Research. *Journal of Information Technology Education, Vol 6*.

Smith, C., Hofer, J., Gillespie, M., Solomon, M., & Rowe, K. (2003). How teachers change: A study of professional development in adult education (NCSALL Rep. No.25). Boston: National Center for the Study of Adult Learning and Literacy.

Smith, T. C. (2005). Fifty-one Competencies for Online Instruction. *The Journal of Educator Online, Volume 2*.

Sodemann, K. (2008). Soft Skills: Important in the World of Work and How to Train Them. *Asia Pacific Technical HRD Conference and Career Expo-08* (p. 20).

Kuching: Asia Pacific Technical HRD Conference and International College of Advanced Technology Sarawak, Malaysia.

Spiller, D., & Harris, T. (2013). Learning from evaluations: Probing the reality. *Issues in Educational Research, 23(2)*, 258.

Spöttl, G. (2000). *Study on work, technology and training in manufacturing sector of Malaysia's industry*. Flensburg: GTZ.

Spöttl, G. (2004). *Work process orientation of the TEVT system and consequences for NOSS – an instrument for the development of occupational profiles. Report for Berufsbildungsinstitut Arbeit und Tecknik (biat).* Flensgurg: Universitat Flensburg.

Spöttl, G. (2007, October 27). Standards for TVET Teacher Training. TT-TVET working paper present at the TT-TVET international meeting. Malacca, Malaysia.

Spöttl, G. (2009). *Standardisation in TVET Teacher Education: Teacher Education for TVET in Europe and Asia: The Comprehensive Requirements.* Fransfurt: Peter Lang.

Spöttl, G. (2010a). Comprehensive quality concept fot TVET in Europe. *PhD Seminar*. Bremen: ITB, Uni-Bremen.

Spöttl, G. (2010b). Teacher Education for TVET in Europe and Asia: The Comprehensive Requirements. *Journal of Technical Education and Training*, 1-15.

Spöttl, G., & Davis, B. (2008). *Draft Work-process Analysis Handbook, University of Bremen, ITB.* Bremen: ITB, University of Bremen.

Spöttl, G., Dittrich, ,. J., & Kämäräinen, P. (2008). *Quality indicators and shaping measures as a basis for standard-settingin TVET teacher education The TT-TVET Trans-national Standards for TVET Teacher Education.* Bremen: ITB, Uni-Bremen.

Standards for the Education, Competence and Professional Conduct of Educators in British Columbia. (2008). *Published Standard*. Canada: British Columbia College of Teachers.

Steward, J., O'Halloran, C., Harrigan, & Spencer, J. A. (1999). Identifying appropriate tasks For the preregistration year: Modified Delphi Technique. *British Medical Journal, 319(7204)*, 224-229.

Stracke, C. M. (2011). Competence Modelling for Innovations and Quality Development in E Learning: Towards learning outcome orientation by competence models. *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunication.*

(2008). *Strategic Plan 2008-2013.* Kuala Lumpur: MARA Vocational and Technical Division.

Stratford, R. (1994). A Competency approach to educational psychology practice: The implications for quality. *Education and Child Psychology, 11*, 21-28.

Strauss, A. L., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques.* London: Sage.

Streble, M., Robinson, D., & Heron, P. (1997). *Getting the Best Out of Your Competencies.* Brighton: Institute of Employment Studies, University of Sussex.

Streveler, R. A., Olds, B. M., Miller, R. L., & Nelson, A. M. (2003). Using a Delphi Study to Identify the Most Difficult Concepts for Students to Master in Thermal and Transport Science. *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition.* Colorado: American Society for Engineering Education.

Student assessment-as-learning at Alverno College. (1994). *Guideline*. Milwaukee: Alverno College Institute.

Sulaiman, M. (2013). The development of k-workers through the implementation of National Dual Training System (NDTS) in Malaysia. *Malaysia Economy Report*. Putrajaya, Malaysia: Department of Skills Development, Ministry of Human Resources.

Swist, J. (2000). *Conducting a Training Needs Assessment.* Retrieved from AMXI Website: http://amxi.com/amxmi3O.htm.

Tasie, G. O. (2011). Competency-based training needs analysis (TNA): An empirical study of gulf university for science and technology, Kuwait. *International Research Journal of Management and Business Studies,1(2).*

Teacher Standard. (2008). *Brochure*. USA: International Society for Technology Education.

Technical and Vocational Education and Training (TVET) in Malaysia. (2013). *Presentation slide*. Putrajaya, Malaysia: Ministry of Education.

Terell, S. R. (2012). Mixed-method Research Methodologies. *The Qualitative Report,17(1),* 258-280.

The Eight Malaysia Plan, 2001-2005. (2000). *Document*. Kuala Lumpur: The Economic Planning Unit.

The Electrical Wireman Examination. (2008). *Printed Syllabus*. Kuala Lumpur: Malaysia Energy Commission.

The National Vocational Qualification in Electricity System Technology Level 2 and 3. (2006). *Qualification Handbook*. London, United kingdom: City & Guild.

The Ninth Malaysia Plan, 2006-2010. (2005). *Document*. Kuala Lumpur: The Economic Planning Unit.

The Tenth Malaysia Plan: 2011-2015. (2010). *Document*. Kuala Lumpur: The Economic Planning Unit.

Thurmond, V. (2001). The point of triangulation. *Journal of Nursing Scholarship,33(3),* 254-256.

Tilak, J. B. (2002). Vocational education and training in Asia. In J. Keeves, & R. Watanabe, *The Handbook on Educational Research in the Asia Pacific Region* (pp. 673-686). Dordrecht: Kluwer Academic Publishers.

Titus, S. V., & Annaraja, P. (2011). Teaching Competency of Secondary Teacher Education Students In Relation to Their Metacognition. *International Journal on New Trends in Education and Their Implications, Vol 2: Issue 3*, 14-22.

Tovey, L. (1994). Competency Assessment: Strategic Approach – Part II. *Executive Development. Vol.7(1) : 16-19.*, 16-19.

US Department of Education. (2002). Meeting the highly qualified teachers challenge. *The Secretary's annual report on teacher quality*. Washington, DC: Department of Education, Office of Postsecondary Education, Office of Policy, Planning and Innovation.

Usman, A. A., & Pascal, G. (2009). The role of Technical and Vocational Education and Training (TVET) in Human Resources Development: The case of Tumba College of Technology (TCT)-Rwanda. Northern Province, Rwanda: Tumba College of Technology.

Valerdi, R., & Davidz, H. L. (2007). Empirical Research in Systems Engineering:Challenges and Opportunities of a New Frontier. *Proceeding Conference on System Engineering Research* (pp. 1-15). Hoboken, NJ , USA: Stevens Institute of Technology,.

Valli, L., & Peter, R.-A. (2002). New standards and assesments? Curriculum transformation in teacher education. *Journal Curriculum Studies, 34(2),* 201-225.

Varvel Jr, V. E. (2007). Master Online Teacher Competencies. *Online Journal of Distance Learning Administration, X(1).*

Vermunt, J. D., & Verloop, N. (1999). Congruence and Friction between Learning and Teaching. *Learning and Instruction, 9(3)*, 257-280.

Volmari, K., Helakorpi, S., & Frimodt, R. (2009). Competence Framework for VET Professions. *Handbook for practitioners*. Helsinki, Finland: Finnish National Board of Education.

Wan Ahmad, W., Esa, A., & Mohd Saleh, B. (2006). Relationship Between In-service Training with Students' Achievements at TVET Institution in Malaysia. *Journal of Technical Education and Training*, 95-113.

Wan Ngah, W. J. (2008). An Overview of Industrial Technology Education in Malaysia. *The Second International Symposium on Educational Cooperation for "Industrial Technology Education"* (pp. 53-62). Kariya-city, Aichi: Aichi University of Education.

Wan Seman, W. A. (2005). The New Sectors of Economic Growth: The Contribution Role of Technical and Vocational Education. *The National Technical & Vocational Conference 2005.* Kuala Lumpur: Human Resourse Department.

Wayne, I., & Simpson, S. (2013). Designing a Competency-based Talent Management Framework: Developing Job Competency Profiles. Ontario, Kanada: Human Resource System Group.

Webb, E. J., Campbell, D. T., Schwartz, R. D., & Sechrest, L. (1966). *Unobtrusive Measures: Nonreactive Measures in the Social Sciences.* Chicago: Rand McNally.

Weinert, F. E. (2001). Concept of Competence: A Conceptual Clarification. In D. S. Rychen, & L. H. Salganik, *Defining and Selecting KeyCompetencies* (pp. 45-65). Seattle: Hogrefe & Huber.

Wesselink, R., Biemans, H. J., Mulde, M., & Elsen, E. R. (2007). Competence-based VET as seen by Dutch researchers. *European journal of vocational training, 40(1)*, 38-51.

Williamson McDiarmid, G., & Clevenger-Bright, M. (2008). Rethinking Teacher Capacity. In M. Cochran-Smith, S. Feiman-Nemser, & D. Mc Intyre,

Handbook of Research on Teacher Education. Enduring questions in changing contexts. New York: Taylor & Francis.

Wilson, G. (2004). *Problem Solving and Decision Making.* New Delhi: Kogan Page.

Wilson, P. F., & Pearson, R. D. (1995). *Performance-based assessment: External, internal and self-assessment tools for total quality management.* Milwakee: ASQC Quality Press.

Wisniewski, J., Maksimovic, I., Reid, G., Trbanc, M., & Viertel, E. (2003). *Initial Vocational Education and Training in the Republic of Croatia - Assessment and Options for Development.* European Training Foundation's.

Wojcicki, T. P. (2003). Theory to Practice Implementating Teacher Competencies as a Professional Development Activiti. *PAACE Journal of Lifelong Learning, Vol 12*, 59-67.

Yaacob, M. (2008). Malaysia Roadmape to the Future: Leading the Way Through Higher Education. *National Higher Education Conference 2008.* Kuala Lumpur: Asian Executive Programs Sdn. Bhd.

Yamane, T. (1967). *Statistics: An Introductory Analysis.* New York: Harper& Row.

Yassin, M. (2012, September 9). Vocational Education Transformation Programme Begins In 2013 . (Bernama, Interviewer)

Yeasmin, S., & Rahman, F. K. (2012). 'Triangulation' Research Method as the Tool of Social Science Research. *BUP JOURNAL, 1(1)*, 154-163.

Yin, C. C., & Kwok, T. T. (1996). Total teacher effectiveness: new conception and improvement. *International Journal of Educational Management, 10(6)*, 7-17.

Yonghak, L. (2009). Competencies needed by Korean HRD master's graduates: A comparison between the ASTD WLP competency model and the Korean study. *Human Resource Development Quarterly, 20(1)*, 107-133.

Yusoff, Z. (2008). Setting New Direction for Higher Education: The Creation of APEX Universities. *National Higher Education Conference 2008.* Kuala Lumpur: Asian Executive Programs Sdn. Bhd.

Zawawi, I. (2005). Linking Career Development with Technical and Vocational Education: Creating Employable Graduates. *The National Technical & Vocational Conference 2005.* Kuala Lumpur: Human Resourse Department.

Ziglio, E. (1996). The Delphi method and its contribution to decision-making. In M. Adler, & E. Ziglio, *Gazing into the oracle: The Delphi and its application to social policy and public health.* London, England: Jessica Kingsley.

Zimmaro, D. M. (2004). Developing Grading Rubrics. *Published note*. Texas: Measurement and Evaluation Center.